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IN THIS ISSUE

In the search for more direct and specific evidence on the relation of social and other environmental factors to the growth and health of children and to the occurrence of physical and mental disabilities in populations, research workers have turned increasingly to studies on groups of people observed over a period of years. But families move or lose interest and fail to cooperate, and the loss of such families may have serious consequences to the purposes of the study. Using data from a ten-year survey in England, Dr. J. W. B. Douglas and Miss J. M. Blomfield analyzed the effects of family moves on the composition of the survey group and studied the accuracy of respondents' reports under various conditions. They report the results of their analysis in the article entitled "The Reliability of Longitudinal Surveys."

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With more than three million babies born annually in the hospitals of the United States, it is interesting to review the rapid change which has occurred in cultural attitudes toward obstetrical care. In "Hospital Care and the Vanishing Midwife," Paul H. Jacobson presents data that describe the changes in obstetrical care in the past fifty years. Midwife deliveries were about 40 per cent of the confinements forty years ago; in the next twenty years they had decreased to about 10 per cent and the decrease has continued. The majority of confinements attended by physicians were in the home until 1937. Between 1937 and 1947, hospital deliveries increased sharply from 45 to 85 per cent and the percentage is still rising.

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A paper "Attitudes of Males Toward Family Planning in a Western Indian Village" is presented in this issue by William A. Morrison of the Department of Rural Sociology of the University of Connecticut. The analysis is based upon a field study conducted in Badlapur, a village of Bombay State, India. It represents one of the first studies to be conducted in conjunction with a clinic where chemical-mechanical contraceptives were made available to a village population under supervision of the Family Planning Association of India.

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One of the questions asked of husbands and wives in the Indianapolis Study was number of children that they had wanted at the time of marriage. The replies to this question are analyzed in relation to actual fertility of the couple and to fertility-planning status in an article by H. V. Muhsam and Clyde V. Kiser, entitled: "The Number of Children Desired at the Time of Marriage." The authors consider some of the characteristics of the data and possible biases and pitfalls that may be inherent in various types of studies on the subject considered. This is the thirty-second of a series of articles being published in the *Quarterly* under the general title Social and Psychological Factors Affecting Fertility.

THE RELIABILITY OF LONGITUDINAL SURVEYS

J. W. B. Douglas[1] and J. M. Blomfield[2]

In a recent paper on research techniques Cochran[3] makes the following comment on longitudinal surveys: "My guess would be that we now know how to observe groups for as long as three years, and perhaps for as long as five years: beyond that, there are too few successfully completed studies to be able to say that the technique has been mastered." For the past ten years a national sample of children has been kept under observation in Great Britain. Losses have been small and the reliability of the information obtained appears to be high. It therefore seemed of interest to give an account of this sample study; the methods used and the problems encountered are described below.

Nature of the Inquiry

The original stimulus for the study came from the Royal Commission on Population who wished to have information on the use made of the maternity services and on the costs of child-bearing. A Joint Committee of the Population Investigation Committee and the Royal College of Obstetricians and Gynaecologists was set up in 1945 to collect information about the circumstances and costs of all confinements occurring in Great Britain during the first week of March, 1946. The results of this first inquiry were published in 1948.

At the end of the maternity inquiry we found ourselves in possession of a sample that was fully representative of children from all social groups and from all parts of the country. It was unlikely that the chance of obtaining another such sample would recur in the near future and the Committee decided to use this unique opportunity to observe the health, growth and

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[3] Cochran, William G.: Research Techniques in the Study of Human Beings. The Milbank Memorial Fund *Quarterly* April, 1955, XXXIII, No. 2, pp. 121–136.

development of the group of children. The enthusiastic support given by the Society of Medical Officers of Health and the local authorities made it possible to start a longitudinal inquiry which has continued until the present day, in cooperation with the Institute of Child Health (University of London), and supported by grants from the Nuffield Foundation; the Hospital for Sick Children, Great Ormond Street; the Regional Hospital Boards of Great Britain; and the Ford Foundation.

Limitations of money and staff made it necessary to reduce the size of the original sample. This was done by taking only one-in-four of the children of manual workers and of the self-employed, who comprised 72 per cent of the original maternity survey sample. The full numbers of children in the other occupational groups were retained. The result was that the number of survey children was reduced from 12,930 to 5,386. The numbers in the reduced sample were sufficient for most purposes of statistical analysis, and when required the original sample structure could be regained by suitable "weighting." It should also be mentioned that all twins and all illegitimate children were excluded from the longitudinal inquiry (*see* page 232).

During the first ten years of the inquiry six main sources of information have been used:

Home Visits. The homes have been visited nine times by health visitors or school nurses. The records of these visits describe the changing home background of the families, their increase in size, and their movement upwards or downwards in the social scale. They also give a running record of accidents, major episodes of illness and major disturbances of behaviour. These events can be set against the basic information collected early in the survey on such characteristics as the parents' ages, duration of marriage, and education.

Clinical Examinations. The school doctors have examined the survey children twice (at six and seven years-of-age), using a schedule which asked for both a clinical history and an examination paying particular attention to defects of the special senses and locomotor system and to the condition of the nose and pharynx. In addition, the doctors weighed and measured the children.

School Absence Records. A complete record of school absences has been kept by the teachers on special record cards which are changed each year. All prolonged absences (of one week or more) were checked with the mothers in the course of the subsequent home visits.

School Teachers' Questionnaire. At the end of the first year at school, teachers were asked to give information on the type of school and class and on the interest shown by parents in their child's education.

Tests of Mental Ability and School Achievement. Four tests were designed for this inquiry by the National Foundation for Educational Research in England and Wales and given to the children when they were eight years old. There were two tests of reading, one of vocabulary and one picture intelligence test.

Hospital Records. All reported hospital admissions of survey children were checked with the hospitals concerned. The hospital superintendents were asked to state dates of admission and discharge, to give the initial and final diagnoses and to describe the ward layouts and visiting rules.

It will be seen that this inquiry has covered a wide field. In the early years interest was centered on the health and growth of children in relation to their home environment. In later years problems of mental ability and school achievement have become relatively more important.

Return of Survey Forms

It was intended that in each survey all the children should be seen at approximately the same date, but owing to the substantial movement of families and the difficulty in tracing some of them, this could not always be done. A typical pattern of the distribution of interviews is shown in Figure 1 which refers to the visit made in 1950 when the children were 4¼ years old.

The major difficulty in this, as in all other visits, was to trace families that had moved to a new authority. Many were found only after several months; for example, in 1950, sixty-nine children were traced only after the cards were punched

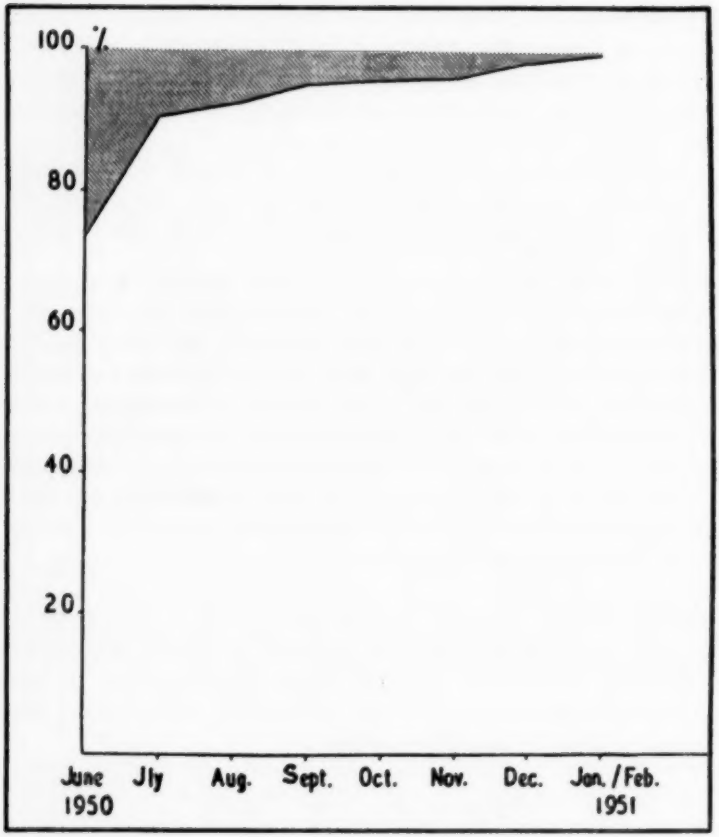

Fig. 1. Rate of return of completed forms in the 1950 survey.

and that part of the survey closed. The missing information for these sixty-nine children was obtained at the next home visit.

The standard of form filling was high, but occasional questions were missed while some of the answers given were inconsistent with information already received. All problems of this type were referred back to the health authorities, who were most helpful. As an example of the help given, the 1950 survey

may again be cited. 3,451 answers were queried and all but 207 of them answered satisfactorily.

We shall now consider a number of questions relevant not only to longitudinal investigations, namely:

1. How far, if at all, has the sample been distorted by withdrawals and other losses?
2. What additional distortion would have been suffered if we had been unable to follow our families across local administrative boundaries?
3. What is the reliability of the information given by mothers about their children's health?

1. The Extent and Nature of the Survey Losses

Two types of loss are involved here: that incurred in obtaining the original maternity survey sample in 1946, and that incurred in following up the children since then.

Maternity Survey Losses. At the time of the maternity survey there was no intention of following the children born. Consequently, the losses were greater than would have occurred if, from the start, we had used all the means of tracing children that were applied at later stages of the inquiry.

The original aim was to investigate all births that occurred during the first week of March, 1946, in all parts of England, Wales, and Scotland. We were fortunate in securing the cooperation of 424 out of a total of 458 local authorities responsible for maternity and child welfare at that time. In the thirty-four authorities unable to take part in the survey, 1,300 children were born during the survey week. It is unlikely that any serious bias was introduced by their loss since the thirty-four authorities were evenly distributed over Great Britain and the combined infant mortality rate for 1946 in those authorities was similar to that for the rest of the country.

In addition, 1,443 children were lost in 1946 because their mothers had either refused to give information or had moved since their confinements and could not be traced. The children concerned formed 9.5 per cent of all those born during the sur-

vey week in the 424 participating authorities. We were able to obtain details of 425 of the children from the antenatal records, and since 1946 we have traced a further 417, so that we now have information about 58 per cent of the 1,443 missing children.

Losses of illegitimate children were high and, indeed, 34 per cent of all illegitimate births occurring during the survey week were untraced. Because of this, and of the difficulties of keeping in touch with unmarried mothers, no attempt was made to include illegitimate children in the follow-up inquiry.

The losses of legitimate children were unevenly distributed over the occupational groups,[4] being highest among the most prosperous families. In order to judge whether these unequal losses have significantly distorted the structure of the sample we have compared in Table 1 the number of children falling into each occupational group of the maternity survey sample with the number that would have been expected if the losses had been randomly distributed over all occupational groups. The third row of the table shows how far the number of children in each group exceeds or falls below expectation. The differences between the numbers found and the numbers expected in each occupational group are small and the 1946 losses produced no serious bias in the sample.

The stillbirth and neonatal death rates in the survey popu-

Table 1. Number of children enrolled and numbers of children expected in each occupational group in 1946.

	Occupational Groups					All Groups
	Professional and Salaried	Black-Coated	Manual Workers	Agricultural Workers	Own Account and Farmer	
Number Enrolled	1,129	1,443	8,998	571	789	12,930
Number Expected	1,164	1,469	8,931	558	808	12,930
Difference	−35	−26	+67	+13	−19	

$\chi^2 = 2.72 \quad n = 5 \quad 0.8 > P > 0.7.$

[4] For a description of the contents of the occupational groups see Maternity in Great Britain, (Oxford University Press, 1948).

lation were closely similar to those for Great Britain during 1946. The survey stillbirth rate was 26 per 1,000 total births as compared with the national figure of 28. The survey neonatal death rate was 28 per 1,000 live births as compared with the national figure of 25. Here is further support for the lack of bias in the sample.

Losses from the Longitudinal Survey. We have already mentioned that the size of the longitudinal survey sample was reduced by excluding illegitimate children and twins and by taking a random one-in-four sample of children in two occupational groups—the "manual workers" and the "own account and farmers." The results are shown in Table 2.

It will be seen that there are eleven fewer children in the follow-up survey sample than were expected, a discrepancy that is explained by the exclusion of illegitimate children who had been wrongly coded as legitimate in 1946. At the same time a number of errors in occupational coding were corrected with a consequent small change in the numbers in the five groups.

During the first ten years of the inquiry, twelve contacts were made with the children at home, school or clinic, and on each occasion some of the children were lost. The losses were of two broad types which will be described separately. First, there were the *unavoidable* losses of children who had died or left the country with their parents; secondly, there were the

Table 2. Numbers of children in each occupational group of the follow-up survey sample compared with the numbers expected from the 1946 maternity survey sample after differential sampling.

	Occupational Groups					All Groups
	Professional and Salaried	Black-Coated	Manual Workers	Agricultural Workers	Own Account and Farmer	
Numbers in 1948 Sample	1,075	1,387	2,157	557	210	5,386
Numbers Expected	1,086	1,399	2,168	554	190	5,397

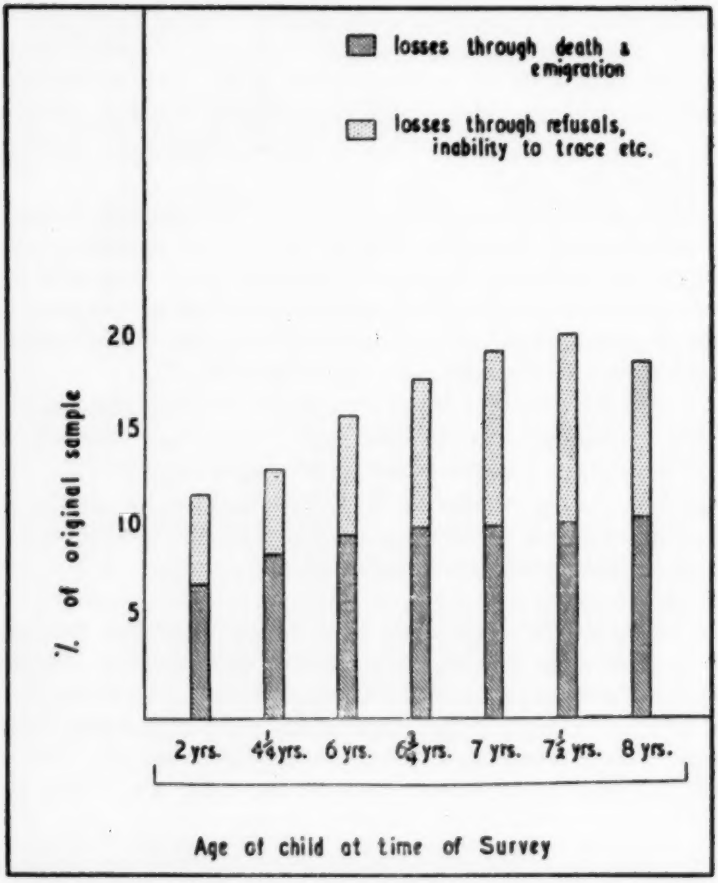

Fig. 2. Losses from the survey sample.

avoidable losses for such reasons as the refusal of a parent to give information or our own failure to trace a child. The first represents a natural decrease in the population, which is not a source of bias, the second needs to be considered more carefully. The proportion of children lost for these two reasons for seven home visits is shown in Figure 2.[5]

[5] Losses from medical examinations, school reports and mental tests were closely similar and need not be shown here.

Unavoidable losses rose steadily from 7.1 per cent at two years-of-age to 10.7 per cent at 8½. In the early years both death and emigration were heavy sources of loss; by 1950, 220 children had died and 240 had emigrated with their families. The loss through emigration was particularly heavy during this early period because of the aftermath of the war. Out of the 240 families lost in this way during the first four years of the survey, 108 were dominion, colonial, or foreign nationals returning to their own countries.

It is likely that many of the families going to the Colonies and all the families going abroad with the Armed Forces will in time return to this country, but no attempt will be made to enrol them again in this survey when they do so. It would be difficult to trace them and, in view of the inevitable gaps in their histories and of the exceptional living conditions abroad, the additional information obtained would hardly justify the expense and effort involved.

Whereas the *unavoidable* losses increased with each successive contact, the *avoidable* losses reached a peak of 10.1 per cent at 7½ years and then declined to 8.3 per cent. This decline reflects the success of efforts to persuade parents who had withdrawn their children to allow them to rejoin. The final figure of 8.3 per cent exaggerates our final loss, since some of the children will be found and included in later surveys when earlier gaps will be filled in. It is probably more realistic to take as completely lost only those children missing in both 1953 and 1954, they amount to 345 or 6.4 per cent of those originally enrolled.

Before discussing any possible distortion of the sample introduced by these losses, it may be of interest to mention that measures have been taken at intervals during the course of the survey to keep alive the interest of those taking part—both the health visitors and the mothers. Two booklets giving a simple account of the more important findings were produced for the health visitors and seem to have been greatly appreciated. In addition, the Committee sent a letter of appreciation

	Professional and Salaried	Black-Coated	Manual			Own Account and Farmer	All Groups
			Skilled	Semiskilled and Unskilled	Agricultural		
Actual Numbers Enrolled	793	1,136	1,255	593	486	189	4,452
Expected Numbers	823	1,143	1,241	579	476	190	4,452
Difference	−30	−7	+14	+14	+10	−1	nil

Table 3. Number of children in each occupational group enrolled in 1954 compared with the numbers expected assuming no bias.

to each mother after the first eight years and offered a free copy of the health visitors' booklet to those who were interested enough to apply for it. Shortage of funds alone prevented the Committee from doing more in this line, which may contribute materially to the success of a long-term survey.

In October, 1954, after excluding the 345 children (missing in 1953 and 1954) and the children who had died or who had left the country, there were 4,452 still enrolled in the survey. Table 3 shows how their actual distribution by occupation of father differs from that which would be expected on the assumption that the avoidable losses were not biased in respect of this factor.

It will be seen that there is a small deficit in the more prosperous groups and a small excess in the poorer groups. But as tested by X^2 the distribution of observed and expected numbers in these six groups is not significantly different.

Similar calculations are shown in Table 4 after regrouping the children by position in family. Here again, there is no significant difference between the observed and expected distribution.

We may conclude that up until October, 1954, the sample had not become appreciably biased in respect of either occupational groups of the parents or ordinal position of the child in the family. Similar conclusions are reached when other charac-

	First Born	Second or Third Born	Later Born	Total
Actual Numbers Enrolled	1,725	2,065	662	4,452
Expected Numbers	1,739	2,057	656	4,452
Difference	−14	+8	+6	nil

Table 4. Number of children of different ordinal position in family enrolled in 1954 as compared with the number expected assuming no bias.

teristics, such as age of mother or degree of crowding, are examined.

It has been suggested that in long-term studies the very fact of being under observation may introduce a bias. For example, in the present study the more intensive and more frequent medical examinations may have revealed defects that would otherwise have been missed. In order to estimate the extent of this bias we shall examine some 2,000 children who, though born during the survey week, were excluded from the longitudinal study when a one-in-four sample of manual workers' children was taken. By comparing their school health records and records of clinic attendances with those of a matched group of the survey children, we shall be able to see in what ways, if any, the latter have been influenced by being enrolled in the survey.

2. Internal Migration as a Possible Source of Bias

Some of the difficulties in following up our children were caused by a high incidence of movement from one local authority to another. And it is of interest to see how far this inquiry would have been biased if we had been unable to extend the survey across administrative boundaries. Most longitudinal surveys have been limited to a single city and all those moving out have been lost, so that this question has considerable practical importance. The following comments refer to the *internal* movements of the population during the first four years of the present survey: it is not feasible at the moment to give an account of movements in more recent years.

During the first four years nearly half of our survey families had moved from where they were living in March, 1946. Some had moved within local boundaries and others had overstepped them. This is to some extent an artificial distinction since when a town is growing rapidly it will expand beyond its administrative area, but the characteristics of the local and non-local migrants are different and they have accordingly been kept separate in the following discussion.

The period 1946–1950 was in some ways abnormal. Movements of population in part represented a return of those who had migrated during the war. On the other hand, throughout the period there was a shortage of houses, limiting freedom of movement especially in the lower income groups. Local authority housing was mainly available for those who were local inhabitants and families moving across administrative boundaries largely moved to privately owned dwellings. The general effect was to discourage the movement of the poorer families or to direct it to areas in which there were relatives to house them.

Only 55 per cent of our families had remained in the same dwelling between 1946 and 1950 whereas 14 per cent had crossed local administrative boundaries and 31 per cent had moved to another address within the same administrative area.

Table 5. Occupational group of families that did not move and of families making local and nonlocal moves in 1946–1950.

Occupational Group	Total	No Change of Address Per Cent	Moved	
			Within Local Boundaries Per Cent	Across Local Boundaries Per Cent
Professional and Salaried	865	16.2	14.5	33.3
Black-Coated	1,193	24.3	23.6	31.1
Skilled Manual	1,303	30.4	30.3	18.2
Semiskilled Manual	347	8.8	7.8	3.5
Unskilled Manual	252	5.9	6.8	1.9
Agricultural	497	9.1	14.0	8.7
Own Account and Farmer	211	5.3	3.0	3.3
Total	4,668[a]	100.0	100.0	100.0

[a] This number refers to complete interviews in 1950; that is to say, it excludes all losses through death, emigration, or other causes.

We cannot show the full extent of movement during these years, for change of address was noted only at the time of each survey and some families may have moved more than once in between. Accordingly, in the following discussion we have simply grouped the families into those that *did not move,* those *moving within local boundaries,* and those *crossing local boundaries.* Attention will be drawn to some of the characteristics of each of these groups.

Table 5 gives the social composition of these three groups. Those that made local moves tended to come from the poorer social groups, especially the unskilled and the agricultural workers. The differences, as compared with families which did not move, are significant, though small.[6] In contrast, the families that moved across local boundaries showed a great excess in the non-manual groups, particularly in the professional and salaried group, whereas those in the manual worker groups, particularly the semiskilled and unskilled, were underrepresented.[7] If all the families that moved across administrative boundaries had been lost and if only the stable families and those making local moves had been retained, the sample would have been heavily biased by the poorer social groups. Instead of an expected total of 710 families of professional and salaried workers remaining in the inquiry there would have been 591, while the number of manual worker families would have been correspondingly increased.

We have next related migration to occupational movement, confining our attention to the two groups of black-coated and skilled manual workers where both upward and downward movements can be clearly distinguished. The results of this analysis are shown in Table 6.

The following statistically significant differences are found: (a) The families that did not move show less occupational mobility than the migrants; (b) families of black-coated workers that make local moves tend to move downwards in the

[6] ($\chi^2 = 32.98$ $n = 6$ $P < 0.001$).
[7] Compared with the families that did not move ($\chi^2 = 186$ $n = 6$ $P < 0.001$).

occupational scale; (c) families of both occupational groups that have crossed local boundaries show a greater upward mobility and, among the black-coated group, a greater tendency to go into business on their own account. These differences cannot be explained by the younger age structure of the migrant families.

It appears, then, that the families making local moves are on the average poorer and of deteriorating social position, whereas those making non-local moves are more prosperous and are mounting the social ladder.

The migrant families differ from the stable families in other respects. The parents are younger and have a relatively low fertility before removal and a relatively high fertility afterwards. In these respects there is little to distinguish the local from the non-local migrants.

The answer to our question of whether the sample would have been biased if we had been unable to follow our families across local boundaries is thus unequivocal. In these circumstances the survey population would have been progressively denuded of the younger and more rapidly growing families, of those in the upper social groups, and of those who were mount-

Table 6. Occupational mobility (1946–1950) of stable families and of families making local and non-local moves.

	Unchanged Occupational Group	Upward Mobility	Downward Mobility	Move to Self-Employment	Total	No. in Group
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	
Black-Coated Workers						
(No Change of Address)	69.6	13.2	14.0	3.2	100.0	569
(Local Moves)	62.7	12.2	20.5	4.6	100.0	327
(Non-Local Moves)	54.5	23.6	13.8	8.1	100.0	246
Skilled Manual Workers						
(No Change of Address)	78.3	6.3	12.4	3.1	100.1	719
(Local Moves)	74.5	9.1	13.7	2.8	100.1	431
(Non-Local Moves)	63.8	15.8	13.8	6.6	100.0	152

ing the social ladder or setting up in their own businesses. During the survey years the extent of these losses would have been sufficient to make the sample decreasingly representative either of the whole country or of individual social groups, and its value would have been greatly impaired. Accordingly, it is of practical interest to see how far losses of this type can be reduced by extending the area of a survey over several adjacent authorities instead of limiting it to a single one. In Table 7 we consider the case in which the authorities are grouped into regional aggregates.

The table shows the percentage of families moving out of each region during the survey years and the average loss for all regions of 4.4 per cent should be compared with the average loss through movement across local boundaries which is 13.6 per cent. Thus, by choosing regional aggregates rather than individual authorities as the unit of study two-thirds of the losses through migration can be avoided.

The number of individual authorities in each region is large and the question arises whether smaller aggregates of authority could profitably be taken. It was originally expected that the main saving would be achieved when urban authorities were related to their surrounding county areas, but this is not

Table 7. Families moving out of each regional aggregate in 1946–1950.

Regional Aggregate	Number of[1] Cooperating Authorities	Number of Children in 1946 Who Were Still Surviving and Enrolled in the Survey in 1950	Per Cent Leaving[2] Region 1946–1948
Greater London and South East	27	1,452	3.0
North	51	1,182	4.3
Midlands	27	807	5.4
East	15	247	5.9
South West	8	155	8.2
Wales	16	253	7.3
Scotland	55	572	3.5
All Parts	199	4,668	4.4

[1] Counties, country boroughs and large boroughs only—the smaller authorities that were Maternity and Child Welfare authorities in 1946 are included with the counties.
[2] Adjusted for sampling fraction.

so as the following figures for Northumberland and Durham and their seven contained county boroughs show. The movement from these authorities considered individually was 17.6 per cent whereas the movement from the whole area was 14.6 per cent; that is to say, by including all the nine authorities in a single inquiry, we should have saved only one-fifth of the losses. This is a far smaller saving than would have been achieved if the whole Northern region had been taken, in which case the losses through migration would have been 4.3 per cent or one-quarter of the losses from the individual authorities.

3. The Accuracy of the Information Obtained

Underlying the whole inquiry is the assumption that women will give reliable answers to questions about their homes and families and that they can remember over varying periods of time specified major illnesses and accidents and the approximate dates when they occurred. It is also assumed that the women can answer with reasonable accuracy such questions as when their child first walked alone, when he was immunized, or when he was taken to an infant welfare center. These assumptions are clearly open to question and our object here is to show how far they are justified.

We obtained the following direct checks on our information:

1. Five local maternity and child welfare authorities were visited and the information on immunization and infant welfare center attendance given on the survey forms was checked with that on the local records.
2. The mothers' answers to questions on hospital admissions were checked with the hospitals concerned.
3. An analysis was made of answers given by the same mothers to the same questions in successive surveys.

These checks have so far been applied only to information gathered during the first four years of the survey, when the interviews were most widely spaced and the possibilities of error greatest.

In the succeeding paragraphs it will become clear that no general statement on the accuracy of memory can be made. The memory and placing of events varies with the intensity of their impact and women who remember the precise date of a hospital admission may give the date of an attack of whooping cough with much less accuracy. The important fact is that similar errors are made by women in all occupational groups so that social comparisons of the age incidence of disease may be valid although the errors in each group are large. It is also important that few of the illnesses asked about appear to have been forgotten and that most diagnoses were given correctly.

Accuracy of Information on Infant Welfare Attendances and Diphtheria Immunization. In Table 8 it will be seen that social differences in the use made of welfare centers are as clearly shown from the answers given when there was a two year period of recall, as from those given concurrently. None of the small differences shown in the table is significant.

When the answers given by mothers in five local authority areas were checked against the public health records it was found that the *dates* of 51 per cent of first attendances at welfare centers were given correctly to the nearest week, 32 per cent showed errors of between one and four weeks and 17 per cent showed larger errors. Seven per cent of the mothers said

Table 8. Proportion of mothers making their first attendance at infant welfare centers in the eight weeks following confinement. (Rowntree, 1950 b).

	Per Cent Using Centers in First Eight Weeks					Total
	Professional and Salaried	Black-Coated	Manual Workers	Agricultural Workers	Own Account and Farmer	
Maternity Survey (1946)	44.5	62.5	61.5	35.1	39.5	6,469[a]
Follow-up Survey (1948)	49.7	63.9	63.2	34.0	37.8	4,690[b]

[a] In the 1946 maternity survey only approximately half the mothers were asked questions on the use of the infant welfare centers. (*See*, Maternity in Great Britain, p. 4.)

[b] This number excludes all losses during the first two years from death (210 children), emigration (118 children), refusal (56 children), and other causes (215 children), and also 97 children whose mothers were interviewed but failed to answer questions on infant welfare attendance.

	Age on Admission (in Months)					Total Number of Children
	0–12	13–24	25–36	37–48	More Than 48	
Mothers	153	127	167	204	12	663
Hospital Records	145	132	166	220	nil	663

Table 9. Comparison of the ages of children when admitted to hospital as recalled by their mothers and as given by the hospital records.

they had attended infant welfare centers when they had not done so. The total *number* of attendances made during the first two years was often incorrectly reported, but in general the number of attendances claimed by a mother was a fair indication of the actual frequency with which she had attended, and when the survey records and the local records were ranked according to the number of attendances in the first year a correlation of $+0.69$ ($n = 92$ $P < 0.001$) was found between the two sets of information.

In the same five authorities the mothers' statements on diphtheria immunization were checked with the health visitors records, and out of 145 answers only two were found to be incorrect (Rowntree 1950 a).

Accuracy of Information on Hospital Admissions. Hospital records were used to check the information given by mothers in respect to 663 hospital admissions during the first four years of life. The ages on admission, as given by the mothers, are compared in Table 9 with the actual ages.

The mothers' reports accurately describe the age distribution of hospital sicknesses in the whole survey population, and the mean reported age on admission (27.4 months) is not significantly different from the true mean age (27.2 months $t = 1.53$ $n = 662$ $0.2 > P > 0.1$).[8] The correlation coefficient relating the ages of admission given by the mothers and by the hospitals is $+0.96$.

[8] This test was based on the errors made by individual mothers and not on a direct comparison of the two means.

When the period of recall is less than two years there is a slight but not significant understatement of the age on admission. With longer periods of recall the age is significantly overstated,[9] but not so much so that the mothers' estimates of the age distribution of early admissions are seriously distorted. With longer periods of recall the women from the lowest occupational groups are the most likely to make gross errors.

It was expected that women with many children would make larger errors than those with few, but this was not so. Nor can it be shown that the dates of admission are better remembered when the illnesses are serious than when they are slight.

We have also been able to check how accurately the number of days spent in hospital is remembered. While there was a close agreement between the mothers' accounts and the hospital records, (as shown by a correlation coefficient of +0.94), there was a consistent tendency to overestimate the length of stay. Thus the actual mean length of stay was 18.0 days whereas the remembered length of stay was 20.7 days.[10] These overestimates were greater when the period of recall was long, when the length of stay was short, and when the mothers belonged to the manual worker group. The errors largely resulted from a tendency to report length of stay in weekly intervals rather than in days.

There is no evidence that mothers who make large errors in recalling age on admission are more likely to make large errors in recalling length of stay. The correlation coefficient relating the size of these two types of error is not significantly different from zero.

Comparing the mothers' statements of reason for admission with the final hospital diagnoses, it was found that only twenty-four were misleading in the sense that they would have led to a different classification of the illnesses concerned if we had used them alone. It is of interest that the majority of these errors were made by the women in the lower groups. Some had given

[9] By 0.63 months ($t = 2.37$ $n = 275$, $0.02 > P > 0.01$).
[10] ($t = 2.21$ $n = 1296$ $0.05 > P > 0.02$.)

the first but not the final diagnosis, for example, a suspected inguinal hernia was reported as such although it was later shown to be a cyst of the spermatic cord. Others mentioned a minor complaint but not a serious complication—for example, a child admitted to hospital with tonsillitis later developed acute nephritis, but only the first was mentioned. In two instances it appears that the mothers were hiding a condition which they considered shameful—a child with congenital syphilis was reported as having a "nervous complaint" and a mentally backward child was labelled "possible infantile paralysis." Finally a mother reported that her child had been in hospital with pneumonia but did not say that the precipitating cause of admission was not this illness but severe erythema following the too enthusiastic application at home of thermogene wool poultices to the chest.

In general, it appears that the mothers have given an accurate account of the hospital admissions of their children and that even if we had had to rely on their memories alone, the reliability of our information on hospital care would still have been high.

How Completely Has Illness Been Reported? In the survey we have only asked about hospital admissions, accidents where the doctor was called in, and the major infectious diseases, and the questions concerned only one child in the family. Even so, a few incidents appear to have been left out; for example, out of 656 accidents to our children between birth and two years forty-six were forgotten or suppressed and only revealed at a later stage of the inquiry. These accidents were all trivial and six of them appear to have resulted from the mothers' own carelessness.

The same questions on incidence asked in successive surveys did not always yield the same results. At two years of age 1,296 children were reported by their mothers to have had either measles or whooping cough or both. But ninety-six mothers failed to recall these illnesses two years later until they were pressed by the health visitors and shown local records. It

Period of Recall	28–33 Months	34–39 Months	40–45 Months	46–51 Months
Age of Child	2 Years to 19 Months	18 Months to 13 Months	1 year to 7 Months	6 Months to 0 Months
	Per Cent	Per Cent	Per Cent	Per Cent
Proportion of Attacks *Not* Reported in the 1950 Survey (*i.e.* Taken at 4 Years of Age)	11.1	7.6	5.9	3.7

Table 10. Comparison of information on measles and whooping cough given in 1948 and in 1950. Losses with different periods of recall.

is worth noting that the mothers were least likely to forget illnesses that had occurred early in their child's life, as Table 10 shows.

The ages of admission to hospital were also best remembered when they occurred within six months of birth and illnesses in infancy appear to have a greater impact on the memories of mothers.

A further source of error lay in the confusion of the survey child with his sibs. Twelve mothers incorrectly attributed accidents or illnesses to the survey children which had in fact occurred to their brothers or sisters.

None of the sources of error discussed in this section appears to be large enough to have distorted the general pattern of reported illnesses.

Present Aims and Future Development

The main fields of interest in the early years of this study are shown by the titles of the twenty-two publications listed at the end of this paper. In addition, a book on the health, growth and environment of the pre-school child is nearly completed. Particular fields of interest at the present time are as follows:

1. We are in a position to isolate and define groups which fail to use the welfare services even when they are available. And we can also assess the value of these services in terms of the health and growth of the children. The infant welfare services

existing in Great Britain today were, to a considerable extent, designed for the economic environment and standards of education of twenty years ago, and it is administratively important to make an objective assessment of how far they meet our present needs. This, we believe, can be done by using the information provided by this survey.

2. We have a unique opportunity to examine the handicaps suffered by certain groups of children and the extent to which they need special help. The largest group and the one that is administratively the most important is made up of the prematurely-born children, about whose health and development there have been many conflicting reports owing to the difficulty in finding adequate samples of premature children and of mature controls to compare them with. In the present study these sampling difficulties are avoided. All children prematurely born during the survey week have been followed up and compared with a closely matched group of children born at term. Four papers comparing the health, growth, and mental ability of premature children with their controls have been published and in general show the former to be little handicapped, though a small well-defined group made exceptionally low scores in tests of school achievement and mental ability.

3. This study is especially well adapted for getting direct evidence on such problems as whether maternal employment has an adverse effect on the child or whether separation from the mother in infancy leads to later difficulties in emotional adjustment. We have accordingly noted all major periods of separation from the mother and all periods during which she was employed. In addition, we hear of all broken marriages in our sample. A paper describing the incidence of such marriages and examining children from broken homes has already been published.

4. The children in the sample are now approaching the point in their school careers when they take the examination which determines whether they go to a grammar, secondary modern, or technical school. Relatively little is known about the factors affecting achievements in this examination, and we hope to examine the part played by the attitude of the parents, by illness or absence from school, by the size of the class, by the frequency of change of teacher, etc.

There would be no difficulty in following our children through the remainder of their school careers, even into their first jobs and, for the boys, until they have completed their National Service. And there are many questions relating to adolescence and entry into employment which could be answered if the survey were continued. It would also be of value to continue to follow the special groups of premature children, deprived children, bedwetters, etc. In such further investigations the problems involved are not likely to be of the kind referred to by Professor Cochran. As has been shown, all the authorities concerned have been extremely cooperative and continue to be so, while our experience suggests that the mothers of the survey children tend to become more, rather than less, cooperative with time. Moreover, the possible "warping" of the survey children can be tested periodically by drawing upon the children not covered by the continuous survey. The main difficulty as regards the future, is primarily one of finance. So far all our interviewing has been carried out without cost to the Committee, the services of the health visitors, school nurses, and school doctors having been given most generously by these groups, with the enthusiastic consent of their authorities. Nevertheless, substantial costs are involved in maintaining the central organization necessary for keeping in contact with the children and the interviewers, and in tracing migrant families, as well as in the processing and analysis of the data collected. And such costs can only be met by correspondingly substantial grants from Foundations.

Summary

A longitudinal study of the health and development of a national sample of children has been described. Losses during the ten-year period for which the survey has been running were analyzed and it was shown that no significant bias has been introduced into the sample thereby.

Internal migration was discussed and the likelihood of a progressive distortion of the sample in longitudinal studies

which do not attempt a national coverage was shown to be considerable. Such distortion could be reduced by covering large regional aggregates instead of a single administrative area.

The reliability of the information given by mothers in answer to questions on their child's health and early history was examined and it was shown that while some events are remembered better than others the errors made are not large enough to lead to an appreciable distortion of the facts.

Acknowledgments

This survey is being made by a Joint Committee of the Institute of Child Health (University of London), the Society of Medical Officers of Health, and the Population Investigation Committee. The chairman of the Committee is Professor James Young; the vice-chairman, Professor A. A. Moncrieff; and the secretary, Professor D. V. Glass. The Nuffield Foundation has financed this inquiry during the pre-school years, and grants for continuing it in the primary school period have been made by the Board of Governors of The Hospital for Sick Children, Great Ormond Street (through the Institute of Child Health); by the Regional Hospital Boards in Great Britain; and by the Ford Foundation.

We wish to thank the chairman and members of the Joint Committee for their help and advice; the Medical Officers of Health, School Medical Officers, and Health Visitors whose generous cooperation made this survey possible, and the mothers in all parts of the country who willingly answered numerous and detailed questions on their children's health.

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HOSPITAL CARE AND THE VANISHING MIDWIFE

PAUL H. JACOBSON[1]

PRIOR to World War I, about 40 per cent of the confinements in our country were attended by midwives (1). By 1935, when nationwide data first became available, the proportion had dropped to 10.7 per cent. Since then, the trend of midwife deliveries has continued downward almost without interruption, the proportion reaching an all-time low of 3.4 per cent in 1953. The data for recent years appear in Table 1.

A number of factors have contributed to the rapidly diminishing role of the midwife. For one thing, the number of midwives permitted to practice has been sharply reduced in recent years by the growing number of states that have established minimum requirements with respect to their education and training, and that have also made provisions for supervision and regulation of their practice. At the same time, physicians have become better trained and more skilled in obstetrics and large numbers of them have specialized in this field.

Hospitals have also greatly expanded and improved their maternity facilities and services. At present, more than nine out of every ten babies are born in hospitals, compared with less than four out of every ten only two decades ago. Moreover, in large areas of the country, particularly in the Northeast and the Far West, the proportion now exceeds 98 per cent. Each year since 1947, more than 3 million babies have been born in hospitals; in 1955, their number probably reached an all-time high of 3¾ million.

Underlying these developments, favorable economic conditions and the spectacular growth of prepaid insurance plans on both an individual and a group basis (2) have enabled an increasing number of families to avail themselves of medical and hospital services.

[1] Statistical Bureau, Metropolitan Life Insurance Co.

Table 1. Midwife and hospital deliveries, registered live births by race, United States, 1935–1953.

Year	Delivered by Midwife			Delivered in Hospital		
	All Races	White	Nonwhite	All Races	White	Nonwhite
	NUMBER					
1953	131,754	24,538	107,216	3,621,362	3,238,180	383,182
1952	139,280	26,412	112,868	3,529,156	3,181,098	348,058
1951	151,116	29,960	121,156	3,376,996	3,056,516	320,480
1950	161,099	33,161	127,938	3,125,975	2,841,930	284,045
1949	168,166	36,777	131,389	3,087,080	2,825,078	262,002
1948	172,000	39,000	133,000	3,025,206	2,784,865	240,341
1947	175,000	41,000	134,000	3,136,930	2,925,374	211,556
1946	167,048	40,171	126,877	2,708,223	2,538,882	169,341
1945	167,805	41,128	126,677	2,155,594	2,018,929	136,665
1944	178,520	45,975	132,545	2,112,963	1,987,082	125,881
1943	192,715	50,886	141,829	2,115,582	2,002,313	113,269
1942	196,061	54,470	141,591	1,906,833	1,808,121	98,712
1941	203,815	59,751	144,064	1,537,719	1,448,132	89,587
1940	204,968	64,621	140,347	1,316,768	1,238,677	78,091
1939	208,843	68,000	140,843	1,158,528	1,089,708	68,820
1938	217,917	74,296	143,621	1,098,530	1,034,750	63,780
1937	220,344	76,384	143,960	987,032	929,386	57,646
1936	223,577	82,247	141,330	878,222	826,841	51,381
1935	229,977	85,645	144,332	795,629	746,974	48,655
	PER CENT OF TOTAL DELIVERIES FOR EACH RACE					
1953	3.4	.7	19.7	92.8	96.5	70.3
1952	3.6	.8	21.5	91.7	95.7	66.4
1951	4.0	.9	23.6	90.0	94.4	62.4
1950	4.5	1.1	26.1	88.0	92.8	57.9
1949	4.7	1.2	27.6	86.7	91.6	55.1
1948	4.9	1.3	29.2	85.6	90.4	52.9
1947	4.7	1.3	31.5	84.8	89.3	49.7
1946	5.1	1.4	33.8	82.4	87.1	45.2
1945	6.1	1.7	37.3	78.8	84.3	40.2
1944	6.4	1.9	39.0	75.6	81.0	37.0
1943	6.6	2.0	41.7	72.1	77.2	33.3
1942	7.0	2.2	44.0	67.9	72.7	30.6
1941	8.1	2.7	46.7	61.2	65.7	29.0
1940	8.7	3.1	48.0	55.8	59.9	26.7
1939	9.2	3.4	49.8	51.1	55.0	24.3
1938	9.5	3.7	51.1	48.0	51.6	22.7
1937	10.0	4.0	52.4	44.8	48.2	21.0
1936	10.4	4.4	53.8	40.9	43.9	19.5
1935	10.7	4.5	54.0	36.9	39.6	18.2

Source: National Office of Vital Statistics, except that deliveries by midwives in 1947 exclude estimated number by other attendants which could not be separated from those by midwives in Georgia and Mississippi, and that the 1948 figures allow for the estimated number by midwives which were grouped with other attendants in Georgia, Kentucky and Mississippi.

Another factor which accounts for the growing popularity of hospitalized confinements is the passing of foreign-born women out of the childbearing ages. Years ago, immigrant women, following the customs and traditions of their homeland, preferred the care of the midwife. She thus played a prominent role in the large cities where the foreign-born population was concentrated. Just after the turn of the century in New York City, for example, midwives attended more than 50,000 maternity cases a year, or 44 per cent of all deliveries. Since then, however, the demand for the midwife's services has declined so rapidly that today midwives attend less than 1/100 of 1 per cent of the total live births registered in that City (3).

The midwife is disappearing from an ever-widening area of the country. As may be seen from Table 2, by 1948 there were sixteen states and the District of Columbia in which midwives either were not practicing at all or had delivered fewer than 0.05 per cent of the live-born. Currently, they have virtually disappeared from four additional states and in ten others attend no more than 1 per cent of the deliveries. All thirty of these states are located in the Northern and Western regions of the country. Midwife deliveries represented only 0.09 per cent of the live births in these areas in 1953; as recently as 1935, the proportion was sixteen times as great.

As a result of the decreased demand for midwives, in many areas of the country she now does not attend a sufficient number of confinements a year to retain her proficiency. To cope with this problem, New York City has been steadily tightening its regulations and, among other things, now requires the midwife to deliver at least three cases a year to qualify for annual relicensure. Currently, only four midwives remain in New York City; prior to 1910, there were more than 3,000.

The institution of midwifery has actually been declining ever since the 17th Century, following the invention of the obstetric forceps. For many generations thereafter, however, the employment of a physician at birth was limited to the upper classes and the well-to-do. Indeed it was not until the turn of

Table 2. Number of midwives in 1948; and per cent of registered live births delivered by midwives in 1953, 1948, and 1935.

Geographic Division and State	Per Cent of Births Delivered by Midwives									Number of Midwives, 1948
	Total			White			Nonwhite			
	1953	1948	1935	1953	1948	1935	1953	1948	1935	
United States	3.4	4.9	10.7	.7	1.3	4.5	19.7	29.2	54.0	20,700[a]
New England	.00	.01	.4	.00	.01	.4	—	.05	1.0	38[a]
Maine	.01	.03	—	.01	.03	—	—	—	—	[b]
New Hampshire	—	—	.06	—	—	.06	—	—	—	1
Vermont	—	—	.09	—	—	.09	—	—	—	0
Massachusetts	—	.00	.00	—	.00	.00	—	—	—	0
Rhode Island	.01	.05	1.7	.01	.05	1.6	—	—	3.8	6
Connecticut	.01	.01	1.6	.01	.00	1.7	—	.1	1.4	21
Middle Atlantic	.09	.1	2.4	.08	.1	2.4	.2	.4	1.9	477
New York	.08	.1	2.5	.07	.07	2.5	.2	.5	2.9	48
New Jersey	.1	.4	6.6	.1	.4	7.0	.1	.4	2.3	161
Pennsylvania	.08	.08	.8	.06	.06	.8	.3	.3	.7	268
East North Central	.04	.05	1.0	.03	.04	1.0	.2	.1	.9	600[a]
Ohio	.02	.03	.3	.02	.02	.3	.07	.09	.2	450
Indiana	.06	.05	.7	.06	.06	.7	.03	.02	.8	3
Illinois	.06	.06	1.7	.03	.05	1.7	.3	.1	.5	[b]
Michigan	.03	.05	1.1	.02	.03	1.0	.2	.3	3.1	[b]
Wisconsin	.04	.05	.9	.03	.05	.9	.4	.4	1.3	[b]
West North Central	.3	.3	1.2	.2	.2	1.1	3.0	4.0	4.5	100[a]
Minnesota	.1	.07	1.4	.1	.07	1.4	.2	.5	2.8	27
Iowa	.03	.02	.07	.02	.01	.06	.3	1.6	1.6	0
Missouri	.8	1.1	3.0	.4	.6	2.7	4.2	6.3	7.0	46
North Dakota	.2	.05	1.4	.1	.04	1.4	2.3	.3	1.6	[b]
South Dakota	.7	.2	.4	.5	.2	.3	5.6	1.4	1.9	[b]
Nebraska	.02	.00	.1	.01	—	.1	.4	.1	—	0
Kansas	.02	.02	.3	.02	.02	.3	.08	.2	1.9	[b]

South Atlantic	9.8	13.5	28.0	1.0	2.0	10.3	30.7	41.6	67.0	6,782
Delaware	3.4	4.1	15.6	.7	.4	8.1	16.4	23.2	54.3	31
Maryland	1.7	4.0	9.2	.3	1.0	4.0	7.1	15.1	27.6	160
District of Columbia	.06	.02	.06	.04	—	.04	.08	.06	.08	0
Virginia	9.1	12.8	28.2	1.4	2.6	13.1	31.8	42.3	65.3	2,000
West Virginia	1.5	2.0	6.8	1.4	2.0	7.1	3.2	1.8	2.0	194
North Carolina	10.3	12.6	28.6	1.0	2.4	11.4	28.8	34.6	65.3	869
South Carolina	19.9	29.1	49.4	.6	2.0	12.0	44.5	62.1	84.2	1,513
Georgia	15.5	20.6[a]	40.7	1.1	2.3[a]	14.8	40.6	53.0[a]	78.0	1,560
Florida	9.6	14.3	28.6	.9	2.1	9.4	32.6	46.7	73.1	455
East South Central	13.3	17.2	29.4	2.2	4.5	13.7	39.3	50.2	70.5	6,440
Kentucky	3.9	6.7[a]	19.5	3.9	6.9[a]	20.0	3.6	4.7[a]	10.8	1,200
Tennessee	4.0	6.0	12.9	1.6	3.4	9.3	13.3	18.3	32.6	1,278
Alabama	18.1	22.0	36.4	1.6	3.0	12.6	44.5	54.4	74.8	1,701
Mississippi	30.1	37.4[a]	50.4	1.0	3.7[a]	9.2	53.0	65.8[a]	84.9	2,261
West South Central	7.1	10.9	19.0	3.8	5.5	9.2	20.3	33.5	62.2	5,813
Arkansas	13.5	15.1	25.2	1.0	1.9	8.3	43.3	55.6	79.2	1,137
Louisiana	6.9	15.0	40.1	.9	2.6	19.1	16.4	34.3	68.9	1,229
Oklahoma	1.7	2.0	4.0	.4	.4	2.2	11.0	14.6	25.5	185
Texas	7.2	10.7	15.1	5.7	8.3	9.9	17.1	26.5	52.0	3,262
Mountain	1.4	2.4	5.8	1.3	2.3	5.9	3.8	4.3	4.3	400[a]
Montana	.3	.2	2.8	.2	.08	2.2	2.0	2.9	10.9	0
Idaho	.04	.03	.6	.04	.03	.6	—	.5	.8	2
Wyoming	.09	—	.3	.02	—	.3	2.6	—	—	0
Colorado	.4	.7	1.2	.4	.7	1.2	—	—	.8	12
New Mexico	5.7	11.9	23.0	5.8	12.1	24.0	4.0	9.3	1.0	268
Arizona	2.6	2.9	8.4	1.9	2.7	9.2	6.3	4.4	4.1	[b]
Utah	.03	.02	1.6	.03	.02	1.6	.4	.3	.9	11
Nevada	.1	.05	1.0	.04	—	.7	.8	.8	5.1	0
Pacific	.02	.1	1.4	.02	.1	.8	.03	.2	14.1	50
Washington	.04	.03	.8	.02	.02	.4	.3	.2	14.5	0
Oregon	.02	.01	.5	.02	.01	.3	—	.2	11.6	2
California	.02	.2	1.7	.02	.2	1.0	.01	.2	14.2	48

[a] Estimated. [b] Not available. [c] Allows for estimated number of deliveries by midwives which were grouped with those by other attendants.
Note: Dash (—) indicates no midwife deliveries.
SOURCE: Statistics on registered live births, from the National Office of Vital Statistics; number of midwives, from the health departments in New York City, District of Columbia, and the forty-eight states.

Table 3. Percentage distribution of registered live births by race and attendant according to age of mother and birth order, United States, 1950.

Age of Mother Birth Order	All Races				White				Nonwhite			
	Physician in Hospital	Physician Not in Hospital	Midwife	Other and Not Specified	Physician in Hospital	Physician Not in Hospital	Midwife	Other and Not Specified	Physician in Hospital	Physician Not in Hospital	Midwife	Other and Not Specified
Total	88.0	7.1	4.5	0.4	92.8	5.9	1.1	0.2	57.9	14.3	26.1	1.7
Age of Mother (Years)												
Under 15	64.8	15.4	17.6	2.2	83.5	11.7	2.6	2.2	55.5	17.3	25.0	2.2
15–19	83.9	8.2	7.2	.7	92.0	6.5	1.2	.3	58.4	13.6	26.4	1.6
20–24	89.0	6.3	4.3	.4	93.8	5.1	.9	.2	59.5	13.6	25.1	1.8
25–29	89.7	6.3	3.7	.3	93.5	5.3	1.0	.2	58.7	14.2	25.3	1.8
30–34	88.9	6.7	4.0	.4	92.9	5.7	1.1	.3	55.9	15.2	27.4	1.5
35–39	84.1	10.4	5.1	.4	88.5	9.4	1.8	.3	53.1	17.0	28.6	1.3
40–44	81.2	12.6	5.6	.6	85.8	11.8	2.0	.4	50.4	18.3	29.7	1.6
45 and Over	75.9	14.3	8.9	.9	84.3	13.2	2.5	.0	41.0	19.2	35.2	4.6
Birth Order[1]												
First	93.1	4.4	2.3	.2	96.1	3.4	.4	.1	68.1	12.6	18.1	1.2
Second	91.6	5.2	2.9	.3	95.1	4.1	.6	.2	60.3	14.4	23.7	1.6
Third	87.8	7.2	4.6	.4	92.6	6.1	1.1	.2	56.3	14.8	27.3	1.6
Fourth	83.0	9.8	6.5	.7	89.1	8.8	1.7	.4	54.5	14.4	29.0	2.1
Fifth	77.1	12.6	9.4	.9	84.5	12.3	2.7	.5	52.1	13.8	32.0	2.1
Sixth	71.0	16.2	11.6	1.2	78.9	16.5	3.8	.8	50.1	15.5	32.1	2.3
Seventh and Over	60.9	20.8	16.7	1.6	69.3	22.9	6.4	1.4	44.8	16.8	36.4	2.0

[1] Number of children born alive to mother

Source: Estimated from reports by the National Office of Vital Statistics showing births in the United States classified by attendant, age of mother, and birth order; and data supplied by state registrars showing births by attendant according to age of mother in Connecticut, Georgia, Maryland, and Mississippi and by attendant according to birth order in Arizona, Florida, Idaho, Maryland, Minnesota, and New Mexico.

the 20th Century that physicians became the usual attendant at birth and even then this was the case primarily among native white families.

The available data on midwives indicate that the number practicing in the United States has been declining since at least the early 1920's. Compared with about 62,000 at that time (4), there were 47,000 a decade later (5) and less than 21,000 in 1948. Although a later nationwide estimate is not available, there are indications that even fewer midwives are now in practice.

Although the midwife is steadily passing from the American scene, she has not yet vanished. Her work is being increasingly concentrated in the rural areas of the South, and especially among the Negro population. Currently, more than 98 per cent of all midwife deliveries in the country occur in the eighteen states of the South and Southwest (including New Mexico and Arizona, which are grouped with the Mountain states).[2] In 1953, midwives delivered 129,480 live births, or 9.7 per cent of the total in these states, the proportion varying from 1.5 per cent in West Virginia to as much as 30 per cent in Mississippi. In only two states—Texas and New Mexico—do midwives now deliver more than 5 per cent of the white babies. Among the nonwhite population, however, there still are eleven Southern states in which from one sixth to one half of the mothers are delivered by midwives. Thus, of the 131,754 babies delivered by midwives in the United States during 1953, about 77 per cent of the total were among nonwhite mothers in these eleven states.

The midwife's services are also used more frequently by older women and by those with larger families, as is evident from the data for 1950 shown in Table 3. Among nonwhite women, for example, the proportion delivered by midwives increases from about 25 per cent at ages under 30 years to almost 30 per cent at 40–44 years, and to 35 per cent at ages beyond 45. The

[2] In 1948, there were approximately 19,410 midwives—93.8 per cent of the country's total—practicing in these states.

upswing in relation to birth order is even more pronounced, the proportion rising from about 18 per cent for confinement of a first child to more than 36 per cent for orders after the sixth. The patterns are fairly similar for white women, but the frequencies are much lower; the proportion is less than 3 per cent at every age period, and no higher than 6.4 per cent for mothers having their seventh or subsequent birth.

Hospital deliveries are at a maximum for mothers in their early twenties—almost 94 per cent for white women and 60 per cent for the nonwhite. The proportions are even higher for women having their first or second child.

The increasing utilization of medical and hospital services is an important factor in saving lives. As recently as 1935, the maternal mortality rate in the United States was 58 per 10,000 live births; currently, it is less than 6 per 10,000 nationally, and in large sections of the country it is appreciably lower. Infants have also benefited; during these two decades, their mortality rate dropped from 56 per 1,000 live births to less than 27 per 1,000.

Although great strides have already been made in safeguarding mothers and infants, opportunities still exist for further progress, particularly in the rural areas of the South. Fortunately, the prospects are that the situation will continue to improve as the public health and hospital building programs go forward. In the meantime, the midwife remains indispensable in areas where medical services are lacking.

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ATTITUDES OF MALES TOWARD FAMILY PLANNING IN A WESTERN INDIAN VILLAGE

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THIS paper[2] reports part of a study of family planning attitudes and practices among men in Badlapur Village, Bombay State, India, made during 1954.[3] An analysis is made of those factors which were found to be significantly associated statistically with the desire for additional offspring and attitude toward use of birth control on the part of the men of the village. The village of Badlapur has a population of approximately 3,200 persons who are members of forty-five endogamous caste groups and who represent the Hindu, Muslim, Christian and Jain religions. Since the village is forty-two miles from Bombay City, those men of the village who work in either the offices and factories of Bombay or in the nearer lesser urban aggregates commute daily to their places of work by railway from the station, one and one-half miles from the village itself. The village, as well as the region of which it is a part, is still predominantly agricultural, for almost two-thirds, 61.7 per cent, of the persons of the region are dependent upon agriculture for a livelihood.[4] A cultural disparity clearly exists

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[4] The region consists of two administrative districts of Thana and Kolaba. Data obtained from the district handbook series: THANA DISTRICT CENSUS HANDBOOK. Bombay, Government of Bombay Press, 1953; KOLABA DISTRICT CENSUS HANDBOOK. Bombay, Government of Bombay Press, 1952. These present the data gathered in the 1951 Census.

between urban and rural, between city and village, in India, even though the village may be situated near larger urban aggregates. Village India today is largely untouched by influences from urban India, although conditions in the villages are slowly changing. Badlapur is a village, representative of the more than five hundred thousand villages which constitute village India in which more than eighty per cent of the population of the nation still dwell.

The Male Sample

The male interviewers[5] were instructed to interview married men, for to have questioned single men about such subjects would have been misunderstood in the village. They were not to interview men who either were too old or who considered themselves to be too old to have more offspring or who were less than 15 years of age. The sample, 124 males, therefore, as well as the universe populations[6] of the study, 573 males, constitute a group of married males 15–54 years of age.

A detailed discussion of the representativeness of the sample, using the frequency distributions of the sample and the universe populations, is not made here because of limitations of space. The data which indicate the degree of correspondence of the sample and the universe populations with respect to the four variables of age, education, caste and occupation are presented in Table 1. The degree of correspondence between the sample and the universe distributions are shown by the values of P. With respect to occupation the P value is high and is moderate with respect to the other three variables. The moderate to high values of P here indicate that the sample does mirror the universe population, that it is representative.

[5] The author is indebted to Mr. Krishnanath Y. Karnik and Mr. Vasant P. Gokhale who obtained most of the interviews for this study. Both men worked with the author throughout the two years spent in the village. The replies were recorded by them in Marathi and were then translated into English by Mr. Hari C. Bhagwat and Mr. Manohar G. Orpe. Without their assistance the work would not have been possible.

[6] The universe population is based upon a census conducted by the author in the village in 1953. It represents a later enumeration than the April, 1951, Census of the Government of India.

Variable	Chi Square	Degrees of Freedom	P Value
Age	4.0641	2	13.5
Education	4.2897	2	11.9
Caste	4.2308	2	12.2
Occupation	4.6500	6	58.3

Table 1. Correspondence of the sample with the universe population in terms of several variables indicated by the chi-square test of goodness of fit.

Desire For Offspring

When asked the question, "If you want more children, how many more do you desire?", thirty-six men replied that they did not desire more offspring. Proportionately they constitute a surprisingly large group, 29.0 per cent of the total sample population of 124 males. The social and demographic characteristics of this group, *ie.*, those not desiring additional offspring, were very different from those of the group desiring more offspring. The relationship between desire for offspring and a number of variables is presented below. These variables do not exhaust the possibilities but they do represent some which proved statistically significant.

The data presented in Table 2 show that a direct relationship is involved between the number of living offspring and desire for additional offspring. The percentage of men with 0–2 living offspring who desired no additional children was almost nil, 6.8 per cent, while eight out of ten of those with 6–11 living children desired no additional. This was not com-

Table 2. The sample population by number of living children and by desire for additional offspring.

Number of Living Offspring	Desire More Offspring	Desire No More Offspring	Total	Per Cent Desire No More of Total
0–2	49	3	52	6.0
3–5	36	18	54	33.0
6–11	3	15	18	83.0
Total	88	36	124	29.0

Chi Square 39.8670 Chi Square Probability Nil

pletely expected, for it is often stated that the villager is desirous of an unlimited number of offspring. The data contradict this belief.[7] The three cases with 0–2 offspring who desired no additional children appear to be severely atypical of their group. Two of the three, with high school education, high caste status, and clerical employment, intimated that economic considerations were the overt basis for their statement. They felt that they could not both maintain their present level of living and sufficiently educate their present children if they had more progeny. The third case, a man of 33 years, a tenant farmer, of an agricultural caste, had eight offspring die before the present living male child was born to him. It is questionable, in the author's opinion, that he will remain satisfied with only one offspring, should this one male child live. He appears to be an exceptional case, more closely associated in value orientation with the other 94 per cent of the 0–2 offspring group. Here as in other aspects of Indian life, values are in conflict within the individual's frame of reference. Traditional values encouraging and venerating large families clash with the newly acquired non-traditional urban industrial society's emphasis upon standard of living and trends toward individuation.

Three of the group with 6–11 living offspring desired more children (Table 2). They are atypical of their group in this respect. Upon closer examination, one man, a tenant farmer, was found to be uneducated; the second, an owner of a tea and candy shop, had a 1st–4th grade education; while the third, a goldsmith, had a 5th–7th grade education.[8] Their mean age

[7] To check this finding, a chi square was also run on the association between total number of offspring, both living and dead, and the attitude under consideration. The result was 34.0955, with the probability of its having occurred by chance as nil. The change in attitude occurred at the 7–8 total offspring group, among whom 72.7 per cent desired no additional progeny. In contrast there were only 37.9 per cent of the 5–6 total offspring group who were of the same opinion. There is a possibility that many of these variables do measure the same thing. The author is now engaged in treating the data with multiple variable techniques to ascertain the validity of this hypothesis. However it is felt that the insights provided by the use of the present technique are enough to warrant their presentation at this time.

[8] The educational distribution of the universe male village population was as follows: 41.2 per cent uneducated, 24.4 per cent 1st–4th grade, 23.2 per cent 5th–7th grade, and 11.2 per cent secondary school and beyond.

was 42.0. They had 2.3 living male offspring, and they had been married an average of 18.7 years. All three indices are below the levels shown to be necessary for the opposite attitude to become operative. They articulated traditional values in overt economic terms as the first subject's reasons for desiring more children illustrate: children were valuable help in cultivation and other farm work, and his sons would support him in his old age. He desired as many sons as possible. The second male stated that he wanted more children, as many as fate should decide. It should be noted that his economic situation, from all appearances, was better than average. The third interviewee, the goldsmith, desired another daughter, after which he indicated he would have the vasectomy operation performed. Of these three subjects the first two mirror the traditional attitudes and value orientation, while the last in some respects is not traditionally oriented. He appears to be more closely associated with the majority of those with 6–11 living children who desire no additional offspring.

A direct association is observed between number of living male offspring and desire for additional progeny (Table 3). Most significantly, desire for no additional offspring is clearly associated with three or more living male progeny, for 70.4 per cent of the males in that group held this opinion, while those males with fewer than three living sons were desirous of additional offspring. When this table is compared with the preceding one, it is clear that male offspring is a crucial factor in

Table 3. The sample population by number of living male offspring and by desire for additional offspring.

Number of Living Male Offspring	Desire More Offspring	Desire No More Offspring	Total	Per Cent Desire No More of Total
0–1	63	6	69	8.7
2	17	11	28	39.3
3–7	8	19	27	70.4
Total	88	36	124	29.0

Chi Square 37.6360 Chi Square Probability Nil

determining desired size of family, for men with three living male offspring desired no more, yet if male children are not differentiated, six living progeny were necessary to make manifest the attitude. This reinforces the predominant emphasis within the village culture's traditional frame of reference of the necessity of male offspring.[9] Yet contrary to the often stated belief, the villager is not passive or fatalistic concerning the desired number of male children, but apparently is satisfied with three living male progeny or six total offspring. In the presence of extremely high morbidity and infant and child mortality conditions, the villager often hedges on the desired number, for he realizes implicitly if not explicitly that approximately four out of ten of his children will die before they reach the age of five.[10] The implications of these findings are clear, for some of the atypical cases which desire more offspring, yet whose characteristics would seemingly place them in the opposite category, possess male offspring in numbers below this critical level.

The group of six males with 0–1 living male offspring who desired no additional are atypical of their general group (Table 3). Their mean number of total living offspring was 2.7, much less than the level indicated in Table 2. They had been married an average of only 9.5 years, only one was married 20 years. Their mean age was 36.2 years, again less than the critical level shown to exist in Table 5. Education furnishes a partial key to their attitudes and value orientation, for three had high school educations, two were of the 1st–4th grade level and only one was illiterate. Clearly their value orientations were non-traditional, manifest in their desire for no additional male children, although many of their other characteristics, indicated by the figures above, would logically place them in the

[9] This point is fully developed in Pandhari-Nath Prabhu's HINDU SOCIAL ORGANIZATION. Bombay, Popular Book Depot, 1954, pp. 215–29.

[10] Chandrasekhar, S.: HUNGRY PEOPLE AND EMPTY LANDS. Baroda: M.S. University of Baroda, 1952, pp. 155–7; Davis, Kingsley: THE POPULATION OF INDIA AND PAKISTAN. Princeton, Princeton University Press, 1951, pp. 33–7; and STATISTICAL ATLAS OF BOMBAY STATE (PROVINCIAL PART) REVISED EDITION. Bombay, Bureau of Economics and Statistics, Secretariat, Bombay. P. 116 for infant mortality rates.

opposite category. The three men with high school education possessed levels of aspiration for their family and their children which could not be attained if more progeny were born. The articulation of this viewpoint in their replies was a clear statement of the non-traditional value orientation.

Another aberrant group is composed of the eight males with three or more living male offspring who desire more progeny. They possessed an average of 4.3 living offspring, were married a mean of 10.2 years, were 36.5 mean years of age. These figures indicate that they should be expected to desire more children, since the levels associated with each factor are below the critical mark. However they were not too well educated since two were illiterate, three had a 1st–4th grade education, and three were of the 5th–7th grade level. Whatever the dynamics of the attitude formation, they exhibited a traditional value orientation in this matter, since all desired more offspring, indicating the high value they ascribed to a large family.

Number of years married also proved to be significantly associated with desire for additional progeny (Table 4). Whereas only 3 (7 per cent) of 44 married under ten years desired no additional offspring, 13 (two-thirds) of 20 males married twenty years or over did not desire more children. It is acknowledged that the population bases for these comparisons are small. It is also recognized that among the males married "under ten years" are some who are newly married and child-

Table 4. The sample population by number of years married and by desire for additional offspring.

Years Married	Desire More Offspring	Desire No More Offspring	Total	Per Cent Desire No More of Total
Under 10	41	3	44	7.0
10–14	27	9	36	25.0
15–19	13	11	24	46.0
20–24	4	8	12	67.0
25 and Over	3	5	8	63.0
Total	88	36	124	29.0

Chi Square 26.6750 Chi Square Probability .000024

less. Duration of marriage is undoubtedly highly related to number of offspring, yet because of the social and cultural factors involved in early marriage in village India, the two variables are not necessarily similar, and so have been treated independently here. These findings again indicate the incorrectness of the common assumption that the Indian villager has a fatalistic outlook on size of family.

Closer inspection of the three subjects, atypical of their general group, married less than ten years who did not desire more children, shows that all have an above-average education for each attended high school. One had three living offspring, two sons and a daughter; the second had two daughters; while the third had a son and a daughter. These men were of a superior socio-economic group, a group which desired both to maintain their present level of living and to give to their children suitable education. To do this they could not afford additional offspring.

The nine men, married 10–14 years, who desired no additional offspring, were a minority within their general group. They too were better educated than the sample; four were of the 1st–4th grade level, four were of the 5th–7th, and one was in the high school category. They represented the middle and lower status groups, for five were of the middle class castes, two were washermen, one was an agriculturalist, and one an untouchable shoemaker. They had a mean of 3.8 living children, the mean number of living male offspring was 2.3, and their average age was 35.8 years, all below the critical levels. This evidence indicates that the members of this group are non-traditional in value orientation, not positively valuing an unlimited number of offspring.

Two other atypical groupings remain in Table 4 to be analyzed in greater detail. They are the four cases of the 20–24 years married and the three cases of the 25 years and over married who desired more offspring, for in both of these groups the majority opinion was in favor of no additional offspring. Of the four married 20–24 years who desired additional progeny, one was uneducated, two were of the 1st–4th grade group,

while the fourth was in the 5th–7th grade level. Their mean age was 40.5 years. The mean number of living offspring of the group was 5, but they had an average of only 1.5 male living offspring. In contrast, the eight who desired no additional had an average of 4.8 living offspring and 3.0 living male offspring. These figures indicate critical differences between the two groups. These four were from lower status castes, for one was a high caste agriculturalist (now a teacher), one was a barber, another was a practicing agriculturalist, and the fourth was an artisan belonging to a South Indian caste. The barber and teacher indicated that they wanted only one more son, while the other two replied that children were valuable and they would take as many as came, not specifying the desired sex. One of the latter two, a tenant farmer, indicated that children were very valuable for a farmer, for they could do much farm work. This reflects the traditional farmer's value orientation. All four men, in stating that they desired more sons, were articulating the traditional cultural positive valuation of a large family.

Three of the eight who were married 25 years and over desired additional offspring. They had an average of 3.7 living children and 1.3 living male offspring, considerably less than the proportion shown to be adequate by the standards of the male villager. All three were illiterate, one was a tenant farmer, while the other two were landless laborers. Their mean age was 45.0 years. Each expressed a desire for one more male offspring but, significantly, all stated that they felt they or their wives were now too old for another conception. This group's attitude is representative of the orthodox positive valuation of additional male offspring. The men involved come from very low status castes and could be expected to place a high positive value upon large families. In contrast, among the five cases who desired no additional offspring, we find an average of 7.4 living offspring and 4.8 living male progeny. These men were much better educated, were of higher status castes, were much more secure economically, and were slightly

Age Group	Desire More Offspring	Desire No More Offspring	Total	Per Cent Desire No More of Total
15–34	57	9	66	14.0
35–44	24	18	42	43.0
45 and Over	7	9	16	56.0
Total	88	36	124	29.0

Chi Square 17.2175 Chi Square Probability .000187

Table 5. The sample population by age and by desire for additional offspring.

older, 48.0 mean age. These differentials tend to emphasize the superior socio-cultural status of the latter group of five who desired no additional offspring.

The age factor is an important demographic variable associated with desire for additional children, with the relationship being an inverse one (Table 5). Although only slightly more than one in seven of the age group 15–34 years desired no additional children, a majority of those aged 45 or more were of that opinion. Due to the customs both of child marriage and the differentials in age normally found between bride and groom, years married, number of offspring, and age are not necessarily the same, and so have been treated separately here. A man may be relatively young, yet have been married for a great many years and may or may not have a large family. Further statistical treatment of these variables will most probably point up their areas of interrelatedness and independence.

Of these men 45 years and over in age, the numbers desiring and not desiring additional offspring were almost the same. (Table 5). The characteristics associated with each group are interesting. The seven who desired more offspring were below the sample average in education,[11] for five had no education and two had a 1st–4th grade education. In contrast, of those nine who desired no additional progeny, three had a 1st–4th grade education, five had attained the 5th–7th grade level, and

[11] The sample's education range was such that 57.3 per cent were in the nil to 4th grade level, 29.0 per cent were in the 5th–7th grade group, and the remainder, 13.7 per cent, were in the secondary and higher category.

one had a high school education. The mean number of living children for the former group was 4.0 and for the latter 7.1, while the former group had 1.6 living male progeny and the latter had 4.2, differences statistically significant in view of the marked preference of those males with six or more living progeny or three living male offspring to desire no additional children. Certainly the two groups do possess markedly different and significant characteristics.

Education would also seem to be related to a desire for progeny, in light of the detailed findings discussed previously. Of the five factors found to be significantly associated statistically, it proved to be the least so. But this is not to minimize the educational factor, for its level of significance indicates that it plays a very important role. Although there was no majority in any educational group which desired no additional offspring, the difference in the magnitude between the percentage which desired no more children in the "nil to 4th grade" group and the "5th to 7th grade" group is very great. Additional work is being done to determine the role of education in its interaction with the other variables, for it is our hypothesis that education may be more important than its chi square probability would lead us to believe.

Of the group with the highest educational attainment, ten of the seventeen in the group desired additional offspring. (Table 6.) Upon closer analysis of the cases in these two groupings, several differences appear. First, the average age of

Table 6. The sample population by education and by desire for additional offspring.

Educational Category	Desire More Offspring	Desire No More Offspring	Total	Per Cent Desire No More Offspring
Nil to 4th Grade	59	12	71	17.0
5th to 7th Grade	19	17	36	47.0
Beyond 7th Grade	10	7	17	41.0
Total	88	36	124	29.0

Chi Square 12.0765 Chi Square Probability .002401

the ten who desired more offspring was 31.5 years; it was 36.7 years for the seven who did not desire more. Actually seven of the ten in the former group were in the 30–34 age bracket, while only two of the seven of the latter group were in this range. This is significant for 35 years of age proved to be the critical age level in the desire for no additional offspring. (Table 5.) Of the ten who desired additional children, two were using contraceptives for spacing purposes and six of the others stated that they planned to have the vasectomy operation performed after the desired number of sons were born to them, indicative of their non-traditional value orientation. Incidentally, the additional number of sons desired by this group ranged from one to three. Of the six cases who planned to be sterilized after their families were completed, four had only daughters at the time of the interview, helping to explain their desire for sons. Of the two who had living male offspring, one had two sons and a daughter and the other had a son and a daughter. The other four men with no male offspring had an average of two daughters, which is a small sized family, much below the critical levels.

The group of seven who desired no additional progeny had an average of 4.4 living offspring, and a mean of 2.0 living male progeny, but the ten who desired more had an average of 2.2 living offspring and a mean of .7 living male progeny, averages which are considerably less than those of the group of seven who desired no additional offspring. When the average number of years married for each group are compared, a large differential, 8.7 years in contrast to 14 years, is found. Twenty years of marriage was found to be the critical level for change of attitude to a desire for no additional progeny (Table 4). The group, desiring no additional progeny, with a high school level of education, was married on an average of six years less than the critical level of twenty years. Thus education and the socio-cultural factors which it subsumes appears to function positively in bringing about a desire to limit and stop the procreation of offspring, for all associated indices are lower in the high school educational level group than those shown to be

Variable	Chi Square	Degrees of Freedom	P Value
Age at Marriage	.1940	3	Greater Than 80.0
Occupation	2.5705	5	76.0
Caste	3.3950	3	34.0

Table 7. Summary table for those variables found not to be significantly associated with the desire for additional offspring by the chi square test of goodness of fit.

minimum for the general group. Clearly the better educated possess a value orientation, which has modified to a marked degree the norms and values of the traditional village culture.

Three other variables proved not to be statistically significant in their association with the desire for children. They were age at marriage, occupation, and caste. Logically a strong case might be made for both occupation and caste as important indices. Apparently they are not, for as the data of Table 7 indicate, the level of probability associated with these indices is much higher than that customarily accepted as statistically significant.

Attitude Concerning the Use of Contraceptives

In reply to the question: "Would you like to learn a method by which you and your wife can avoid pregnancy for at least two years?", thirty-two males answered in the affirmative.[12] They represent 25.8 per cent of the sample of 124 males. Since a willingness to utilize contraceptives to prevent further conceptions can be hypothesized to involve additional components of a non-traditional value orientation on the part of the male villager, it should not necessarily be expected that those variables found to be significantly associated with desire concerning additional offspring will be significant here.

The factor most significantly associated statistically with a positive attitude toward the use of contraceptives was education. A direct relationship exists between amount of education and expressed willingness to utilize contraceptives. The un-

[12] Included in this group were those who were willing to use contraceptives as well as those who expressed a desire to have the vasectomy performed, since both are types of birth control.

educated group were almost unanimous, 93.0 per cent, in their unwillingness to utilize them, while the members of the group having an eighth grade education or better had a majority, 53.0 per cent, in favor. The change in attitude from unfavorable to favorable begins to manifest itself in the fifth to seventh grade level, where approximately four out of ten of the members were favorably inclined. It may be concluded that increasing education and increasing willingness to utilize contraceptives are directly and significantly associated.

Upon closer scrutiny the two uneducated cases who were willing to use contraceptives appear to be exceptions for all of the quantitative indices associated with them would not differentiate them from those uneducated men who were not willing to use birth control. Both had three living children only; one had one son, the other had two. The former stated that he desired as many more children as fate should decide since children are valuable to a farmer. The latter desired no more. The former is a member of an agricultural caste, while the latter is from a tribal caste. The desirability of having a two-year spacing between births appealed to the former. Actually both cases possess more of the characteristics associated with the desire for additional offspring, and their general socio-economic status would tend to be in harmony with that view. It really is difficult to ascertain why these two men were willing to use birth control.

The number willing to use contraceptives in the 1st–4th grade educational level was a small minority too, whose characteristics demand more attention. Five of the six cases of this group desired no additional progeny, while the sixth desired another son. Four of the six said they were willing to have the vasectomy performed,[13] while the remaining two were

[13] As part of the service provided by The Family Planning Association of India's clinic which was established in the village as part of the study, the vasectomy operation was performed by surgeons of the Association in the Bombay Center. Only men who were of a certain age, with a specified number of healthy children were accepted for the operation. The policy of the clinic was to try to make contraceptives acceptable, and no concerted effort was made to popularize the vasectomy. All services of

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satisfied with contraceptives. They had an average of 4.3 living offspring, and had a mean of 2.5 living male offspring, which are below the critical levels however (Tables 9 and 10). Their caste status varied, for the first three, an agriculturalist, an outcaste, and a washerman, were of low to very low status, while the remaining three, a Muslim, and two shopkeepers, were middle class caste in status. Beyond the educational and caste factors, conceived as manifest indices of the non-traditional world orientation, as possible suggestions for their willingness to use birth control, here seen in terms of the vasectomy operation by a majority of the six, we have no additional clues concerning the causal factors in the determination of their attitude.

A comparison of the two groups within the high school educational category yields some insight concerning the factors which differentiate them. Of the nine favorable towards birth control, four had the vasectomy performed and three were husbands of women using birth control. Of the remaining two, one planned to be sterilized, while the other stated a preference for contraceptives. By contrast, in the group of eight who were not willing to use contraceptives, six said that they would undergo the vasectomy as soon as their desired number of additional sons were born to them. One of the two remaining individuals was following the traditional incorrect method,[14] while the other voiced the traditionally sanctioned attitude that he would accept as many sons as fate should decree. The number

the clinic were provided free to the villagers. Incidentally, this was the first family planning study made in rural India with which a clinic was established which provided the services of a trained midwife-nurse, medical examinations conducted by a medical doctor, free chemical and mechanical contraceptives, and surgical sterilization. The studies and the clinics operated in conjunction with them by the Government of India advocated only the rhythm method of birth control.

[14] The customary village practice is not to have intercourse from the onset of menstruation for fifteen days. Following this method, intercourse would begin at the time of ovulation, the most fertile period. Those who follow this custom in the hope of restricting conception are actually unknowingly doing their utmost to achieve it. Indeed, this traditional practice is not followed correctly either, as is proven when the Shastras are referred to. In THE LAWS OF MANU it is written:

"45. Let (the husband) approach his wife in due season, being constantly satisfied with her (alone); he may also, being intent on pleasing her, approach her with a desire for conjugal union (on any day) excepting the Parvans.

46. Sixteen (days and) nights (in each month), including four days which

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of living sons and offspring of the men in each group varied, the former having an average of 1.8 living sons or a total of 4.4 living offspring, and the latter group an average of only .8 living sons and 2.5 living offspring, the critical levels for the determination of this attitude were not reached by either group. Although the group which was willing to use contraceptives clearly had both more living male and female offspring than did the latter group, the numbers which they had were less than those shown to be critical in Tables 9 and 10. With educational attainment here held constant, the factor of male issue appears to be most important, even though the number of males needed to satisfy the level of aspiration of this group of high school educated males is less apparently than for the general sample. The males in this educational bracket are non-traditional in value orientation, for six of the eight now not willing to use contraceptives plan to undergo the sterilization operation after the desired sons have been born. Desire for male issue is apparently a crucial variable for the men of this educational level even though they manifest non-traditional values in respect to family size.

Number of living children proved to be the second most significantly associated variable.[15] A direct relationship exists be-

differ from the rest and are censured by the virtuous, (are called) the natural season of women.

47. But among these the first four, the eleventh, and the thirteenth are (declared to be) forbidden; the remaining nights are recommended.

128. A twice-born man who is a Snataka (householder) shall remain chaste on the new-moon day, on the eighth (lunar day of each half-month), on the full-moon day, and on the fourteenth, even (if they fall) in the period (proper for conjugal intercourse)."

Buhler, G.: translator THE LAWS OF MANU, Vol. 25, THE SACRED BOOKS OF THE EAST. Oxford, Clarendon Press, 1886, III, 45–47, pp. 85–6; IV, 128, p. 149.

Manu places two different sets of restrictions on intercourse. First: it may take place during the first sixteen days of the cycle, beginning with the onset of menstruation, but several days within this period are forbidden, the first, the fourth, the eleventh and the thirteenth. Secondly: certain days within the lunar month are also forbidden, even though they may fall within the period of the wife's cycle during which intercourse may take place. Today, those villagers who try to follow the traditional customs have reversed the first completely, and may or may not follow the second. If they were correctly followed, more effecive birth control could be achieved by these traditional methods.

[15] Number of total offspring (both living and dead) was tested for its level of

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Educational Status	Not Willing To Use	Willing To Use	Total	Per Cent Willing To Use of Total
Not Educated	25	2	27	7.0
1st–4th Grade	38	6	44	14.0
5th–7th Grade	21	15	36	42.0
8th and Higher	8	9	17	53.0
Total	92	32	124	26.0

Chi Square 19.7316 Chi Square Probability .000203

Table 8. The sample population by educational status and by attitude toward the use of contraceptives.

tween the number of living children and willingness to use contraceptives, for the group with 0–2 living children were almost unanimous in their desire not to use them, while a majority of the group with 6–11 living progeny were in favor of their use. A much larger proportion, 83.3 per cent, of the group with 6–11 living offspring desired no additional offspring (Table 2) than the proportion, 55.6 per cent, of the same group (Table 9), who were willing to use contraceptives. The cases which caused the decrease in the percentage were the five who desired no additional children but who did not desire to use contraceptives. The educational status of three of these five cases was the 1st–4th grade level. Men with this level of education were found to be preponderantly not in favor of birth control (Table 8). These three cases replied that they would exercise control in intercourse with their wives, the traditional incorrect method. The remaining two cases had a 5th–7th grade education. One felt that he was too old, 52 years, to procreate more children, and so did not see the necessity of birth control. The other, aged 43, advanced several reasons for his unwillingness to use contraceptives. He too stated that he could control conception by having intercourse with his wife only during the traditionally defined period. These overt reasons illustrate the importance both of the role of education and of the value ori-

association. It was found to be statistically significant in its association, being associated at the .04 level. The association was a direct one, and the critical level was reached in the 9–13 total offspring group, where 50.0 per cent were willing to utilize contraceptives.

entation of the individual in the determination of willingness to use contraception.

A direct relationship is involved between number of living male offspring and willingness to use contraceptives (Table 10). While less than one in ten with no living male child was willing to utilize them, six out of ten with four or more living male progeny were amenable to their use. The degree of association between the two variables is less than between those in Table 9, where total living offspring was considered, which indicates that willingness to use contraceptives is not as greatly determined by number of living male progeny as by total living offspring, if only these two factors are considered. The critical levels of the variables of number of living offspring and living male progeny where a change to a favorable attitude does occur are higher for the contraceptive associations than for the desire for additional offspring associations, again indicative of the lesser importance of the factor of size of family and of the greater importance of socio-cultural factors such as education, caste, and value orientation in the determination of an attitude of willingness to use contraceptives.

Caste as a variable proved to be associated significantly at the 5 per cent level. The largest proportion in favor of contraceptive usage was found in the middle class caste group, with approximately four out of ten so inclined. The three other multi-caste groupings had a much smaller proportion in favor. Of the eighteen middle class castemen in favor, all had a fourth grade education or better, with the exception of three whose

Table 9. The sample population by number of living offspring and by attitude toward the use of contraceptives.

Number of Living Offspring	Not Willing To Use	Willing To Use	Total	Per Cent Willing To Use of Total
0–2	46	6	52	12.0
3–5	38	16	54	30.0
6–11	8	10	18	56.0
Total	92	32	124	26.0

Chi Square 14.4072 Chi Square Probability .000768

Number of Living Male Offspring	Not Willing To Use	Willing To Use	Total	Per Cent Willing To Use of Total
0	29	2	31	6.5
1	31	7	38	18.4
2	19	9	28	32.1
3	9	7	16	43.8
4	2	4	6	66.7
5–7	2	3	5	60.0
Total	92	32	124	25.8

Chi Square 15.7122 Chi Square Probability .007347

Table 10. The sample population by number of living male offspring and by attitude toward the use of contraceptives.

educations were in the 1st–4th grade range. Being middle class castes, they were by traditional caste definition non-agricultural in their occupation. However, two were landlords. Their ages ranged from 27 to 46, with a mean age of 38.9 years. Of the group, five were sterilized by The Family Planning Association's doctors shortly after the facilities were made available, since they desired no additional children. Educationally, they were superior, for three were of the high school level, and the other two were of the 5th–7th grade level. They had a mean of 6.2 living offspring and 2.3 living male progeny, and were an average of 41.6 years of age. Although they had less than the critical number of living male progeny, they did possess the critical number of total living offspring shown to be associated with this desire. Several of these men expressed the feeling that contraceptives were not absolutely effective, and so desired the operation. Of the remaining thirteen middle class caste men in this group, seven stated that they planned to have the vasectomy performed, for they had sufficient children and desired no additional. They were an average of 39.3 years of age, had a mean of 4.3 living offspring and 2.6 living male progeny, and were of the 5th–7th educational level. They differed only slightly from the group which immediately underwent the operation, perhaps most significantly in the number of total living offspring. Of the six to be accounted for, three had wives who were using the contraceptives provided by the clinic.

Multi-Caste Groupings	Not Willing To Use	Willing To Use	Total	Per Cent Willing To Use of Total
Middle Class Castes	28	18	46	39.0
Agricultural	43	9	52	17.0
Service and Artisan	9	3	12	25.0
Harijan and Tribal	12	2	14	14.0
Total	92	32	124	26.0

Chi Square 7.4124 Chi Square Probability .05

Table 11. The sample population by caste groupings and by attitude toward the use of contraceptives.

Their average age was 35 years, they had 4.3 living offspring and 1.7 male progeny. Two were of the high school educational level, the other was in the 1st–4th grade group. Number of male issue and age differentiates these men from the preceding groups. The remaining three males indicated their willingness to use them to achieve spacing. Their mean age was 34, two had only one offspring, a male, while the third man had eleven living offspring, seven males and four females. Two of these men were of the 5th–7th educational level, while the other was of the high school category. To summarize, nine of the eighteen 50.0 per cent took immediate advantage of the free services of the clinic to have vasectomies performed or to obtain contraceptives to use, while six of the remaining nine indicated their willingness to be operated upon. Since almost all of the indices were below the critical levels, it is clear that this group is non-traditional in value orientation, not ascribing as high a positive value to a large family as does the traditionally oriented villager. This middle class caste group was definitely action-oriented in the matter of birth control. (Table 11.)

When the nine agricultural castemen are considered, it is strikingly apparent that they were above average in education, for seven of the nine were in the 5th–7th grade educational level. Three of the group had the vasectomy performed and three others indicated their willingness to undergo it. The other three favored birth control for spacing purposes. Their

average age was 33 years. They had a mean of 5.7 living offspring and 3.3 living male children; two had a 5th–7th grade education and one had attended high school, very exceptional for their caste group. Two were employed as clerical help in nearby cities, while the third, the 32-year old landless laborer with eight living children, was in desperate economic troubles. The occupation of the six remaining men was that of tenant farmer, with the exception of one farm operator. Three of them said they would be sterilized after the desired number of children had been achieved, while the remaining three were willing to use birth control. These men clearly exhibit a non-traditional value orienation in respect to family size. The component elements in the development of this outlook cannot be localized, except to indicate the socio-cultural factors included in the term "education."

The three artisan and service castemen who favored contraception appear to be typical of their general caste groups. Their mean age was 32.2 years. They had an average of 4.3 living progeny and 3 living male offspring, which were not adequate according to the indicated critical levels. However their educational attainment was better than average, for two had attained the 5th–7th grade level. Two expressed their willingness to have vasectomies performed. Here too the traditional values are not adhered to by these men in their preferences for birth control.

Of the two cases in the Harijan-Tribal caste group, one wanted no more offspring while the other desired only one son more. They had a mean of 2.5 living offspring and 1.5 living males, greatly below the levels of adequacy. One was uneducated, the other was in the 1st–4th grade category. There was little to differentiate them from their group, except in their stated desire to limit their offspring.

Four other variables were tested but were found to be not significant in their association. They were age, occupation, years married, and age at marriage. Table 12 presents their P values, which are of a magnitude to make them not acceptable

Variable	Chi Square	Degree of Freedom	P Value
Age	3.9672	2	13.5
Occupation	5.7420	4	28.7
Years Married	6.8904	4	14.1
Age at Marriage	.8874	3	Greater Than 80.

Table 12. Variables found not to be significantly associated with attitude toward contraceptive usage as determined by the chi square test of goodness of fit.

under our hypothesis. Of course, when they are treated with multiple variable analysis techniques, they may prove to be of significance.

Summary

This paper has delineated some of the demographic and socio-cultural variables which are significantly associated statistically with affirmative and negative attitudes expressed toward family limitation and contraceptive usage by a sample male population drawn from Badlapur, a representative village of Western India. 28.2 per cent of the males in the sample expressed a desire for no further offspring, and 25.8 per cent of the same sample group stated that they would use contraceptives. The statistical treatment of the data when arrayed by affirmative and negative groups according to the variable under treatment showed some variables to be highly significant in their association.

Much of the data obtained from the schedules have not been treated in this paper. In considering two key questions, it was found that the number of living children, number of living male offspring, years married, age, and education were significantly associated with the desire for additional offspring and the four variables of education, number of living children, number of living male offspring, and caste were similarly associated with willingness to use contraceptives. Actually these variables may measure more than what they themselves indicate, for the interaction effects, the influence of all of the other factors upon the specific one being considered, are not dealt with here.

This problem is under consideration and will be presented in a future publication.

Clearly the socio-cultural milieu of the individual is an important factor in the formulation of the attitudes considered in this study. In this respect two main socio-cultural life orientations for the Indian villager may be established. They are the traditional and the non-traditional life orientation. To delineate all of the component elements which constitute the total configuration of the traditional and non-traditional attitude and value systems is not possible here. Indeed, to do this would necessitate the development of culture and personality profiles for the rural Indian villager, a problem beyond the scope of this paper. When the results of the psychological investigations carried out in Badlapur are available this problem can be approached. At that time their relevance to this problem will be discussed. Now it can be said that the traditional life orientation reflects both the lower socio-economic status of family and caste, the more circumscribed world view and value orientation of the rural villager, as well as a stricter adherence to the traditional religious and cultural values of Indian society. Those who are from a caste of a traditionally higher socio-economic status in the village, who have been exposed to more formal education in the school system which propagates values antithetical to the traditional socio-cultural orientation of Village India, who are aware of and affected either overtly or covertly by the almost alien cultural values of urban-industrial non-traditional India, possess to a higher degree the non-traditional life orientation, reflected here in the desire for no additional offspring and willingness to utilize contraceptives.

The socio-cultural factors analyzed in this study are component elements in these value orientations but do not exhaust all of their component factors. In each and every distribution discussed here, certain groups were shown to be significantly associated statistically with a desire for no additional offspring and with willingness to utilize birth control techniques. In all instances except two, that of the sample population distributed

by education and by desire for additional offspring and the sample population by caste groupings and by attitude toward the use of contraceptives, a majority of the population in the categories of the distributions which represented the most educated group, the largest number of living children, the largest number of living male offspring, the longest married group, the oldest group, and the middle class caste group were favorable to the question under consideration. These individuals possess the non-traditional value orientation. In addition, there were some cases with the same characteristics who were not favorable to the questions. Under analysis it was shown that these cases either possessed the traditional value orientation, positively valuing a larger family, or were men with small families who desired a limited additional number of male offspring, after which they would limit their families and would practice birth control. The latter type individual is non-traditional in value orientation, yet because the minimal number of male offspring had not been born to him, desired more male children. When these male children have been procreated, the apparently latent non-traditional value orientations of their parents will become manifest and limitation and birth control will be practiced. Three living male offspring appear to be the minimal number desired by all males, either traditional or non-traditional in value orientation. The non-traditionally oriented male is distinguished from the traditionally oriented male in that once he has the desired number of male children, he will in all probability limit the size of his family and practice birth control whereas the traditionally oriented male will not do so.

The basic values of the Indian culture and society exist overtly in the personality configurations and world orientations of all villagers today, w[illegible]her traditional or non-traditional in value orientation, for the religious, social and cultural values associated with the family remain as basic factors in the life orientation of every individual. Neither can full status for the adult male be achieved nor can the duties of the married state be discharged without the procreation of male offspring.

Among traditionally oriented male villagers these ancient values are not tempered by antithetical values and attitudes engendered by urban-industrial Indian society. Among the non-traditionally oriented villagers, these values persist, but in modified form. Indeed, a man may possess all of the characteristics shown to be significantly associated statistically with these two questions, yet may or may not be willing to limit his family or practice birth control. A knowledge of the socio-cultural orientation as well as the number of progeny, particularly male, of the individual can considerably clarify and help to define the position of such individuals on these questions. The variables discussed here as well as the factors which influence the development of the non-traditional life orientation in the village male are increasingly fostered in their development in the village India of today, a rural India in transition. The demographic situation is one of hope, for although the proportional representation of the groups in this sample who either wished no further progeny or who were willing to use contraceptives were not of majority proportions, persons with these attitudes and values do exist in reality in the villages of India in surprisingly large numbers. The student of population and family planning can feel certain that the proportional representation of these groups on the village level will slowly increase as the processes of socio-cultural change are fostered by the nation and with this change the climate favorable to family planning should improve as well.

SOCIAL AND PSYCHOLOGICAL FACTORS AFFECTING FERTILITY

XXXII. THE NUMBER OF CHILDREN DESIRED AT THE TIME OF MARRIAGE[1]

H. V. Muhsam and Clyde V. Kiser

IN a recent article in this series Pratt and Whelpton presented some data on the relation of interest in and liking for children to (a) actual fertility of the couple, (b) number of children claimed to have been wanted by the wife and husband at the time of marriage, and (c) number of children that the wife and husband stated that they would like to have if they could begin married life over and if the number were determined only by liking for children. These authors found "a positive relation between the index of interest [in children] and the number of children wanted at marriage and also the number wanted if married life could be relived. . . . This is true for all wives and husbands and for those with children. The number of children wanted at marriage is substantially smaller than the number wanted if married life could be relived for wives and husbands at all levels of interest. Among all couples the number wanted at either period is consistently larger than the number actually born, regardless of level of interest."[2]

In the paper by Pratt and Whelpton, however, the data regarding number of children wanted at marriage were simply handled as one of the possible criteria of interest in children for the purpose of investigating the relation of *interest in children* to actual fertility. The data were presented on the basis

[1] This is the thirty-second of a series of reports on a study conducted by the Committee on Social and Psychological Factors Affecting Fertility, sponsored by the Milbank Memorial Fund with grants from the Carnegie Corporation of New York. The Committee consists of Lowell J. Reed, Chairman; Daniel Katz; E. Lowell Kelly; Clyde V. Kiser; Frank Lorimer; Frank W. Notestein; Frederick Osborn; S. A. Switzer; Warren S. Thompson; and P. K. Whelpton.

[2] Pratt, Lois and Whelpton, P. K.: Social and Psychological Factors Affecting Fertility. XXIX. Interest in and Liking for Children in Relation to Fertility Planning and Size of Planned Family. The Milbank Memorial Fund *Quarterly*, XXXIII, No. 4, October, 1955, pp. 454–455. (Reprint, pp. 1235–1236.)

of wife's and husband's statements considered separately but not jointly. In the present paper some further attention is given to the Indianapolis Study data regarding number of children that the wife and husband (jointly considered) stated that they had wanted at the time of marriage. These data are presented by fertility-planning status and by number of children the couple actually had.

Since increasing use is being made of data regarding "intentions" with respect to size of family in order to estimate future fertility trends, it seems well, also, to consider some of the characteristics of the data and possible biases and pitfalls that may be inherent in the various types of data on the subject.

Netherlands Study. In a paper presented in 1954 at the World Population Conference in Rome, and recently published in the *Eugenics Quarterly,* Groenman described a study of desired size of family carried out in 1950–1951 in Amsterdam by the Institute for Social Research. "A mail questionnaire was sent to women residing in municipalities in the Netherlands with more than 100,000 inhabitants who were planning to marry (for the first time) and who were under 50 years of age. In the Netherlands a couple that wants to get married must give notice of its planned marriage some weeks before. The municipalities where the brides are residing publish names, dates of marriage, etc. Each week the addresses of the prospective brides were sent to the Institute for Social Research, and the mail questionnaires were then distributed immediately.

"The questionnaire opens with a short explanation of the purpose of the inquiry. Then eight questions . . . are asked concerning the ages of the woman and her prospective husband, occupation, church affiliation, and number of children of the woman's parents. The two most important questions, however, are these:

1. If it rested with you, how many children would you consider ideal for your future family?

2. Do you hope to have children in the shortest possible time?"[3]

The author stated that the "average of total returns was 20.6 per cent and of usable returns, 18.5 per cent." (p. 225.) He acknowledged that since the questionnaires were restricted to the eleven large municipalities of the size indicated and since the same number of questionnaires (1,000) was distributed in each of these, the sample is in no sense representative. Nevertheless, the author described the results as "very satisfactory in that they clarified the motivations behind registered birth rate trends." He expressed the belief that the "mail-questionnaire method proved workable." (p. 227.) The value of the Netherlands project would be enhanced if there were an eventual followup to ascertain the extent to which the women did have families of the size that they considered ideal at the time of marriage.

Growth of American Families Study. In the United States, field work recently was completed for a study of the expected completed fertility of a national sample of 3,000 white women 18–39 years of age. This study is being conducted by P. K. Whelpton and Ronald Freedman under the auspices of the Scripps Foundation for Research in Population Problems and the Survey Research Center of the University of Michigan. Although no plans for followup of the *same* women are included, Whelpton has expressed the hope "that a study like the one we are undertaking can be repeated in 1960 so that it will be possible to see how the expectations of women in the different socio-economic classes as reported in February, 1955, compare with performance during 1955–1959."[4] Since the women in the original sample are scattered throughout the United States, problems of relocating the same women five years hence doubt-

[3] Groenman, Sjoerd: Women's Opinion About Size of Family in the Netherlands: Attempts to Measure Desired Family Size. *Eugenics Quarterly*, ii, No. 4, December, 1955, p. 224.

[4] Whelpton, P. K.: A Study of the "Expected" Completed Fertility of A National Sample of White Women. A paper in Milbank Memorial Fund: CURRENT RESEARCH IN HUMAN FERTILITY, New York, 1955, pp. 106–112.

less would be large under the best of circumstances. Actually, names of the respondents were not recorded; in fact, names were not asked by the interviewer.

Study of Future Fertility of Two-Child Families. Another large study which is in the offing in the United States is one which is being planned by a Steering Committee working under the auspices of the Milbank Memorial Fund with grants from the Population Council. Under the plans that have been developed a sample of about 1,200 native-white couples (with wife under 35 and husband under 45) who had second births 4–7 months prior to the interview will be visited and then followed up at least once after a period of about two years. Among the questions at the initial interview will be those concerning the total number of children that the wife hopes to have and the number she really expects to have. Questions are also asked as to how soon she expects to have these children so it will be possible at least to some extent to compare desires and expectations with accomplishment.[5]

As will be noted later, the advantage of longitudinal over retrospective data concerning the relation of children wanted at the time of marriage to eventual performance with respect to fertility is that data of the former type are free from problems of "rationalization." Hence, the direction of cause-effect relationships is more definite. It is realized that definite difficulties confront those who plan a longitudinal study. First of all, there is the possible effect of repeated interviewing on the behavior which is being observed. There are also selections and biases that infiltrate because of "lost" cases and "dropouts" over the period of study.[6]

[5] Kiser, Clyde V.; Mishler, Elliot G.; Westoff, Charles F.; and Potter, Robert G., Jr.: Development of Plans for a Social Psychological Study of the Future Fertility of Two-Child Families. *Population Studies,* ix, July, 1956.

Westoff, Charles F.; Mishler, Elliot G.; Potter, Robert G., Jr. and Kiser, Clyde V.: A New Study of American Fertility: Social and Psychological Factors. *Eugenics Quarterly,* ii, No. 4, December, 1955, pp. 229–233.

[6] Downes, Jean: Longitudinal Studies of Families as a Method of Research. The Milbank Memorial Fund *Quarterly,* xxx, No. 2, April, 1952, pp. 101–118.

See also Cochran, William G.: Research Techniques in The Study of Human

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Kelly's Study of Engaged Couples. Perhaps because of the difficulties and cost of longitudinal studies, few have been made. One study that is germane to the present discussion is E. Lowell Kelly's study of engaged couples which he initiated some twenty years ago. The couples in Kelly's sample were recruited in part from announcements of engagements in eastern newspapers. Oriented largely to factors related to marital happiness and stability, the questions that were asked of prospective brides and grooms included one on number of children desired. The basic design of the study involved periodic contact with the couples after marriage to learn how they were "getting along." The coming of World War II necessitated virtual abandonment of the study but recently Professor Kelly has managed to secure contact with a large majority of the original group. Kelly, Mishler, and Westoff have analyzed fertility desires and fertility expectations before marriage in relation to actual fertility of the couples. The report has not been published, but two pertinent figures have been kindly supplied by the authors. The coefficients of correlation between the preferences regarding family size that were expressed before marriage and the eventual fertility behavior were .27 for wives and .26 for husbands.[7] These are a little lower than the corresponding coefficients .32 and .30 that were secured from *ex post facto* data for *all couples* in the Indianapolis Study. They are considerably lower than corresponding coefficients .38 and .40 for wives and husbands, respectively, in the "*number and spacing-planned*" group of the Indianapolis Study considered separately. The higher correlation in the Indianapolis Study data may reflect the two-way relation of actual number of children

Beings. The Milbank Memorial Fund *Quarterly*, xxxiii, No. 2, April, 1955, pp. 121–136.

Douglas, J. W. B. and Blomfield, J. M.: The Reliability of Longitudinal Surveys. The Milbank Memorial Fund *Quarterly*, xxxiv, No. 3, July, 1956, pp. 227–252.

[7] Westoff, C. F., Mishler, E. G., and Kelly, E. L.: The Interrelationships Among Initial Fertility Preference, Observed Fertility, and Recalled Preference: A Report of a Twenty-Year Study. (In process.)

Note: Since Kelly's sample was recruited largely from published announcements of the engagements, it seems likely that the socio-economic and fertility-planning status of the couples in that sample fall somewhere between the averages for all couples and for number and spacing-planned couples in the Indianapolis Study.

borne and number that the wives and husbands (after 12–15 years of marriage) stated that they had wanted at the time of marriage. Whatever may be the explanation there is no doubt about the need for caution in the interpretation of coefficients of correlation in *ex post facto* data.

Gutman's Study of College Men. Another completed investigation in this area is Gutman's study of college men. This study purports to compare "number of children desired by a group of college undergraduates in 1925" with their actual fertility performance by 1950.[8] Actually, there was no "followup" of the same persons although some of the same persons probably were included in the followup. During the academic year 1925–1926, 90 of the students enrolled in introductory sociology at an Eastern college "were asked to reply anonymously to the question: 'In your day dreams of marriage, do you visualize children; if so how many?'" the data were analyzed by Rice and Willey in 1926.[9]

Some twenty-five years later, Gutman undertook a study of the extent to which the "day dreams" had been translated into achievement. Because of the anonymous nature of the questionnaire, it was impossible to follow up precisely the same group of men. However, it was known that the original sample had been from registrants in introductory sociology during 1925–1926. The registrar furnished the appropriate class rolls consisting of 445 names. A sample of 89 was drawn at random for followup.

In comparison with an average of 2.6 children "wanted" by the students in 1925, the average number of actual children in 1950 was 1.9 for all married respondents and 1.6 for all respondents including six reported as single. Gutman mentioned three general classes of factors that might have been responsible for the deficiency of the actual fertility performance. These are (a) impaired fecundity, (b) practice of contraception, and (c) economic insecurity. These may perhaps be

[8] Gutman, Robert: College Men and The Birth Rate—25 Years After. *Journal of Heredity*, XIII, No. 6, November–December, 1951, pp. 285–287.

[9] Rice, Stuart and Willey, Malcolm: *Journal of Heredity*, XVII, 1926, pp. 11–12.

regarded as equivalent, respectively, to (a) physiological capacity, (b) means of fertility control, and (c) a cultural or environmental factor.

A factor not mentioned by Gutman (although it is of cultural or environmental type) is the potential effect of the wishes of the other spouse on the wishes of the respondent and the actual fertility of the couple. It can easily be shown, for instance, that in the case of random mating, the average family size will be one child less than the average number of children wanted at marriage by both parents (a) if the wishes are spread evenly over the whole range of no-child to six-child possibilities and (b) if all couples actually have the lower of the two-family sizes desired. Under these conditions, the average number desired at marriage would be 3 and the average number of actual births would be 2.

Actually, Gutman's data show a narrower range of fertility desires than that presumed in the theoretical example just given. Neither is there any reason to suppose that the spouse desiring the lower number would always be the one to have the wishes fulfilled. Therefore, one would not be justified in attributing more than part of the difference between the desired and the actual fertility to the factor just described.

Indianapolis Study Data. As already implied, the question regarding number of children wanted at marriage was included in the Indianapolis Study because of its supposed relevance to the hypothesis regarding "interest in and liking for children." The question appeared in the Forms B and C which were the "self-administered multiple choice" questionnaires on which wives and husbands respectively recorded replies to a number of questions relating mainly to attitudes, beliefs, etc.

The question was: "When you were married, how many children did you want? (Draw a circle around the right number.)

0 1 2 3 4 5 6 7 8 or more."

It will be recalled that these forms were filled out independently by the wife and husband in the presence of the inter-

viewer and usually at a pre-arranged evening appointment in the home of the client. An important reason for the presence of the interviewer was that of maintaining the "independent" character of the replies of each spouse. The couples were instructed that there was to be no discussion of the questions and answers and that neither would see the answers given by the other.

The possibility of rationalization of replies in *ex post facto* data regarding number of children wanted at marriage has already been mentioned. This might easily be done quite unintentionally. Many people probably had no clearcut desires before marriage regarding number of children they had wanted. Others may have formed the opinion, which is reflected in their reply, only after an exchange of views on this subject with their spouse during engagement or just after marriage. For still others, the original "ideal number" image may have been forgotten because of changed conditions since marriage. The number of children desired probably changes in time with the coming of children and with other changes of circumstances. Thus, some respondents, consciously or unconsciously, may have related their replies to their present social setting. Their replies may reflect the number of children they think they would have wanted, if, at the time of their marriage, they could have predicted their eventual socio-economic status, their marital adjustment, the sex of their children, and other factors. Regarding the sex of the children it may perhaps be assumed that most people who have any clear opinion about the number of children they intend to have also have some preferences regarding sex of the children. In fact, it is probably the sex distribution of the existing children that provides much of the reason for rationalization of replies concerning number of children wanted at marriage.

Despite the inadequacies that arise from their *ex post facto* nature, the Indianapolis Study data on number of children wanted at the time of marriage exhibit some interesting features, and attention will now be turned to them.

Results from the Indianapolis Study. A summary cross-tabulation of replies of wife and husband regarding number of children wanted at marriage, is given for all 1,444 couples in Table 1. In the first place it will be noted that the "unknowns" number only 46 (about 3 per cent) for husbands and only half that number for the wives.

Almost half of the husbands and wives stated that they wanted two children at the time of their marriage. This may reflect the popularity of the small-family ideal among urban native-white Protestants in this country during the decade preceding 1940.

Husbands reported desires for fewer than two children somewhat more frequently than did wives (17 per cent as against 13 per cent). Among both husbands and wives who wanted fewer than two children, half wanted one child and half wanted no child. No such similarity existed regarding husbands and wives who wanted more than two children. Whereas progressively fewer husbands reported desires at marriage for three, four, and five or more children, more wives wanted four children than three children. Also, more wives wanted six than five children. (Table 1.) This preference of women for the even rather than for the odd numbers might suggest a stronger

Table 1. Couples by number of children wanted at time of marriage by husband and wife.

Number of Children Wanted by Wife	Number of Children Wanted by Husband											
	Total	0	1	2	3	4	5	6	7	8	9+	Not Stated
Total	1,444	119	120	760	233	144	11	7	1	2	1	46
0	91	25	17	44	1	1						3
1	92	6	29	46	5	4						2
2	774	50	64	471	104	51	4	1				29
3	207	17	7	96	59	20	2	1		2		3
4	225	17	3	81	52	57	2	4			1	8
5	10			4		5	1					
6	19	1		8	5	3	1	1				
7												
8												
9+	3					2			1			
Not Stated	23	3		10	7	1	1					1

concern of women than of men with the sex of their children (even numbers admitting equal number of children of each sex). However, this interpretation is not borne out by earlier findings[10] of the Indianapolis Study. It has been found, in fact, that fathers are more frequently concerned than mothers about the sex of their children. Again, however, this information is based, as indicated by the earlier authors, on what may be nothing but *ex post facto* rationalizations regarding wishes relative to the sex of children. The findings may simply indicate that mothers are more reluctant to admit (to themselves or to the interviewer) any actual dissatisfaction with the sex of their children. Almost twice as many husbands as wives stated that if they could have only one child they would prefer one of the sex opposite that of their first child. Thus, although it is possible that the preference of women for pair numbers of children is connected with wishes regarding the sex of their future children, there is no evidence for this in the available data. The average number of children wanted at the time of marriage is slightly higher for the women (2.359) than for the men (2.176).

Table 2. Number of couples with identical wishes regarding number of children, observed, and expected under the assumption of random mating.

Number of Children Wanted	Observed	Expected[1]
No Child	25	7.4
1 Child	29	7.8
2 Children	471	406.1
3 Children	59	33.5
4 Children	57	22.6
5 Children	1	0.1
6 Children	1	0.1
Total	643	477.6

[1] The expected numbers of couples with identical wishes of the two married partners were secured by applying the product of the individual expectancies to the total number of couples in which both wife and husband reported on desired number of children. For example (.541 × .545 × 1376 = .291 × 1376 = 406.1 couples with identical wishes for two children.)

[10] Clare, Jeanne E. and Kiser, Clyde V.: Social and Psychological Factors Affecting Fertility. XIV. Preference for Children of Given Sex in Relation to Fertility. Milbank Memorial Fund *Quarterly*. XXIX. No. 4, October, 1951, pp. 440–492. (Reprint pp. 621–674.)

As 54.1 per cent of the wives and 54.5 per cent of the husbands stated that at the time of marriage they wanted two children, one would expect from chance or random mating that for 29.5 per cent of the couples (54.1×54.5) both the husband and the wife would have wanted two children. The observed proportion was approximately one third (34.2 per cent). Thus had the original data actually been collected at the time of marriage one could say that some tendency existed for persons wanting two children to select partners wanting the same number.

It must again be emphasized, however, that the number of children wanted at marriage is ascertained here by a retrospective investigation, and it is quite possible that any correlation observed is the effect of mutual conditioning since marriage, rather than mate selection. Furthermore, even if such mate selection exists, the correlation between the number of children wanted at marriage by the bride and groom need not be interpreted as *conscious selection* of spouses who want the same number of children; it could arise from assortive mating by such factors as age, educational level, and social status. These factors could affect number of children wanted at marriage just as they affect actual fertility. Recent studies of some of the correlates of "ideal size of family" have been made by Freedman, Goldberg and Sharp[11] and analyses of socio-economic determinants of "expected" family size presumably will be made by Freedman and Whelpton.

In Table 2, the frequency of couples in which both spouses stated the same number of children wanted at marriage is compared with the corresponding frequency expected with random mating. It is seen that in all cases, the former exceeds the latter. With respect to couples with the spouses differing by one or more in the stated number of children wanted at marriage, the

[11] Freedman, Ronald; Goldberg, David; and Sharp, Harry.: "Ideals" About Family Size in the Detroit Metropolitan Area: 1954. The Milbank Memorial Fund *Quarterly*. xxxiii, No. 2, April, 1955, pp. 187–197.

Freedman, Ronald and Sharp, Harry: Correlates of Values About Ideal Family Size in the Detroit Metropolitan Area. *Population Studies*, viii, No. 1, July, 1954, pp. 35–87.

Difference Between Number of Children Wanted by Husband and Wife	Number of Couples	
	Observed	Expected
0	643	477.6
1	413	422.4
2	248	345.4
3	39	75.2
4	27	43.6
5+	6	11.8
All Couples	1,376	1,376.0

Table 3. Observed and expected (under random mating) number of couples, by difference between number of children wanted.

observed numbers consistently fall short of those expected by random mating. (*See* Table 3.)

In order to express the information included in Table 3 in one figure—some kind of correlation index[12]—the mean of the differences, regardless of sign between the number of children wanted by the spouses can be computed both from the observed data and from those "expected" under the assumption of random mating. The former average proves to be 0.847 and the latter 1.150; thus, as a consequence of mate selection, the average difference between the number of children wanted at marriage by the spouses is reduced by .303 or 26.3 per cent of the "expected" difference. This is the proposed measure of correlation. It is obvious that in case of perfect selection, i.e. if each person marries only a partner who desires the same number of children as he himself, the observed mean difference between wife and husband would be *nil* and our index would

[12] It is believed that the relation between number of children reported as wanted at marriage by wife and number reported as wanted by the husband cannot be satisfactorily measured by the product-moment correlation, (r). We are not interested here in a linear relationship between these two variables. We are interested, rather, in ascertaining the frequency of desires for the same number of children, and the comparative frequency of couples with large differences and those with small differences. (It is acknowledged that under *certain restricting circumstances* the coefficient of product moment correlation measures something similar.)

A somewhat similar index was proposed several years ago for a different purpose. *See* Bachi, Roberto: La Mobilità della Popolazione all'Interno delle grandi Città Europee. Roma, Federazione della proprieta edilizia, 1933, 502 pp.

assume the value of 100. Hence, if the data were not retrospective, the measure of 26.3 might be interpreted as a moderate but not very strong tendency to select spouses with similar wishes regarding family size. Since the data are *retrospective* one must add other possible reasons for the husband-wife agreements on "number of children wanted at marriage" over and above those arising from chance and pre-marital selections of the type indicated. One such additional reason is that each spouse might rationalize to some extent on the basis of the children that the couple has. By the same token, however, it should also be noted that, in these data at least, rationalization of replies on the basis of actual fertility apparently was not an important factor. Other reasons, centering around the tendency of mutual conditioning of the spouses, have been mentioned before.

Number of Children Wanted at Time of Marriage and Planning Status. If it is assumed that the number of children desired at the time of marriage represents an attitude held by respondents before they actually were involved in planning their family (except, perhaps as far as the begetting of the first child is concerned), any correlation between the number of children wanted at marriage and the planning status would point toward a causative effect of the number of children wanted at marriage on planning behavior with due regard being given to the reservations of conclusions drawn on the basis of *post hoc ergo propter hoc.*

It should be remembered that efficiently-planned families tend to be smaller than families that are not efficiently-planned. This may, perhaps, be interpreted in either of two ways: (a) couples who want small families plan more efficiently or (b) couples who plan efficiently succeed in keeping their families small. However, no such ambiguity exists if one of the events definitely precedes the other in time.

The average number of children wanted at the time of marriage by both the husband and the wife is lowest among "number and spacing planned" families (*see* Table 4). This would

Planning Status	Husband	Wife	Mean Difference
All Couples	2.177	2.359	0.182
Number and Spacing Planned	2.018	2.051	0.033
Number Planned	2.277	2.773	0.496
Quasi-Planned	2.276	2.443	0.167
Excess Fertility	2.173	2.360	0.187

Table 4. Average number of children wanted at marriage by husband and wife, by planning status of couple.

mean that the desire for smaller families is an incentive to efficient family planning. In view of the *ex post facto* nature of the data, it could also mean that there was some tendency for respondents to let their actual fertility influence their statements regarding the number of children wanted at the time of marriage.

In the "completely-planned" families the number of children wanted by both the husband and the wife is smaller on the average than that for couples of any other planning status (Table 4). Also, the mean difference is smallest and the correlation, as measured by the method defined above, between the number of children wanted at marriage by the spouses is one of the highest. The coefficient of correlation (r) *is* highest in the number and spacing planned group. (Table 5.)

It appears therefore that not only the low number of children wanted by both partners induces the couple to plan their

Table 5. The "suggested measure" of relation of wife's report and husband's report on number of children wanted at marriage, and the product-moment coefficient of correlation (r) of these variables, by fertility-planning status.

Fertility-Planning Status	"Suggested Measure"[1]	Coefficient of Correlation (r)
All Couples	26.3	.35
Number and Spacing Planned	37.0	.51
Number Planned	16.0	.28
Quasi-Planned	37.0	.41
Excess Fertility	8.4	.13

[1] As indicated in the text, the "suggested measure" is derived from the formula:

$$\frac{\text{"Expected" average difference} - \text{observed average difference}}{\text{"Expected" average difference}} \times 100$$

family efficiently, but at the same time the agreement regarding this number, be it small or large, plays a considerable role. On the other hand, it seems as if planning status is not strikingly related to the direction of the difference between the reports of the husband and those of the wife regarding number of children wanted at marriage. (Table 6.)

It is true that only among completely-planned families do the couples in which the wife wanted fewer children than the husband outnumber the cases in which the wife wanted more children than the husband. The difference, though small, is statistically significant. But it seems that the relatively high proportion of wives who wanted fewer children than their husbands wanted represents only another aspect of the small difference between the average number of children wanted at marriage by the spouses who finally became the most successful planners.

The relationship between the reported desires of the two spouses with respect to number of children wanted at marriage was itself systematically related to fertility-planning status: one of the highest correlations is observed for couples with the highest planning status and the lowest for couples with excess fertility.

As the formation of the opinion regarding number of children wanted and the choice of the mate both occur before the couple assumes a definite behavior regarding family planning,

Table 6. Families, classified by planning status and whether husband or wife wanted more children.

	Total	Number and Spacing Planned	Number Planned	Quasi-Planned	Excess Fertility
All Families	1,376	379	200	428	369
Wife Wanted More Children than Husband	423	95	92	121	115
Both Wanted Same Number	643	181	73	219	170
Husband Wanted More Children than Wife	310	103	35	88	84

the former two may be assumed to be the causes of the last, if they prove to be correlated. This confirms the earlier findings[13] regarding the success in family planning of couples who are well equilibrated with respect to various other attitudes and opinions. It is obviously also possible that both the agreement on the number of children that were wanted by the two marriage partners and the efficiency in family planning are consequences of a common psychological characteristic. It may well be that couples who are successful in having no pregnancies except those that are deliberately planned by stopping contraception in order to conceive tend to be a select group with respect to presence of definite agreement of the wife and husband on number of children wanted before marriage. This agreement may, here again, be the direct consequence of deliberate mate selection or indirectly due to assortive mating by various social and economic characteristics. It may even reflect mainly a particularly strong effect of mutual conditioning with respect to the opinion itself or to the reply eventually given at the interview.

Number of Children Wanted and Actual Number of Children. The average number of children that the couples in the Indianapolis Study actually had was, on the average, lower than the number wanted at the time of marriage by the husband and wife. (Table 7.) It is true that a few of the families may not have been completed at the time of the interview. Probably more important, however, are the combined factors mentioned in previous sections, such as the experiencing of sterility and low fecundity and the impact of environmental factors conducive to family limitation. The actual family size was lower on the average than the number that the wife stated that she wanted at the time of marriage in all fertility-planning status groups except "excess fertility." This also held true for husbands except those in the "number planned" group

[13] Reed, Robert B.: Social and Psychological Factors Affecting Fertility. VII. The Interrelationship of Marital Adjustment, Fertility Control and Size of Family. Milbank Memorial Fund *Quarterly*. Vol. XXV, No. 4, October, 1947, pp. 383–425. (Reprint pp. 259–301.)

Planning Status	Number of Children Wanted by		Actual Family Size
	Husband	Wife	
All Couples	2.177	2.359	2.030
Number and Spacing Planned	2.018	2.051	1.065
Number Planned	2.277	2.773	2.283
Quasi-Planned	2.276	2.443	1.993
Excess Fertility	2.173	2.360	2.958

Table 7. Average number of children wanted at marriage and actual family size, by planning status.

in which the average number of children reported as wanted by the husband at marriage was essentially the average of the number actually borne.

Since the average number of children desired by husbands at marriage is somewhat smaller than that desired by wives, it may seem that the actual average family size would have been more nearly predicted by the replies of men than of women. It is emphasized again that the data are retrospective. Men may, in fact, not only more frequently have given no reply to the question regarding the number of children wanted at marriage, but also among those who gave some reply, many may actually have had no definite opinion on this matter and their replies, may have been mainly *ex post facto* rationalizations. However, it is also of interest to note that in the total group of planned and quasi-planned families (Table 8A) the actual number of children equals exactly the number of children wanted by the wife (366 cases), almost as often as that wanted by the husband (371 cases). In the "number and spacing planned" (Table 8B) and "excess fertility" (Table 8E) groups, somewhat more women than men are found in the "same number" categories.

Another surprising feature revealed by the study of the relationship between the number of children wanted at marriage and the actual family size, is the relative rareness of families with as many children as were wanted by one spouse and fewer than were wanted by the other. One might expect this combi-

nation to be relatively frequent because the average size of the planned and quasi-planned families is smaller than the number of children reported as wanted by either spouse at marriage. But whereas among all planned and quasi-planned families

Table 8. Couples by actual family size as compared with number of children wanted at marriage by the husband and wife.

Wife Wanted	Total	Husband Wanted		
		Fewer Children	Same Number	More Children
	A. (=B+C+D) ALL PLANNED AND QUASI-PLANNED FAMILIES			
Total	1,007	166	371	470
Fewer Children	131	66	40	91
Same Number	366	70	205	25
More Children	510	30	126	354
	B. NUMBER AND SPACING PLANNED FAMILIES			
Total	379	21	106	252
Fewer Children	30	9	11	10
Same Number	113	8	55	50
More Children	236	4	40	192
	C. NUMBER PLANNED			
Total	200	52	95	53
Fewer Children	35	21	10	4
Same Number	74	22	40	12
More Children	91	9	45	37
	D. QUASI-PLANNED			
Total	428	93	170	165
Fewer Children	66	36	19	11
Same Number	179	40	110	29
More Children	183	17	41	125
	E. EXCESS FERTILITY			
Total	369	201	102	66
Fewer Children	165	138	14	13
Same Number	133	40	67	26
More Children	71	23	21	27

about 36 per cent have the same number of children as either spouse considered separately had wanted at the time of marriage, among 510 families in which the wife wanted more children than the couple had, only 25 per cent had the same number of children that the husband wanted. Also, among 470 families in which the husband wanted more children than the couple had, only 19 per cent had the same number of children that the wife wanted. The same is true with respect to completely-planned families: among these, 28 and 30 per cent of the families were of the size wanted at the time of marriage by the husband and wife, respectively. In contrast among 252 completely-planned families in which the husband wanted more children than the couple had, only 20 per cent had the same number of children that the wife wanted at the time of marriage. Likewise, among 236 completely-planned families in which the wife wanted more, only 17 per cent had the number wanted by the husband at the time of marriage.

This suggests a very particular way of reaching agreement regarding the number of children. This will appear somewhat clearer when one considers that for many couples, number of children wanted at marriage was the same for both spouses. Among these couples it is obviously impossible to have a compromise of the type: same number as wanted at the time of marriage by one spouse, fewer than the number wanted by the other spouse at marriage.

It is likewise obvious that among couples in which the spouses differed with respect to the number of children wanted at marriage, the final family sizes of the formula: "same as wanted by both" is impossible. Finally, the real compromise: "fewer than wanted by one spouse and more than wanted by the other," is impossible for couples who differed by only one child with respect to the number of children wanted at the time of marriage.

It therefore seems desirable to group the couples into three classes, according to the possibilities of compromise or agreement, regarding the size of their family.

Table 9. Distribution of planned and quasi-planned families according to number of children wanted at marriage in relation to actual fertility and fertility-planning status.

Number of Children Wanted in Relation to Actual Fertility	All Planned and Quasi-Planned Families	Number and Spacing Planned	Number Planned	Quasi-Planned
A. COUPLES WITH BOTH SPOUSES WANTING THE SAME NUMBER OF CHILDREN				
All Couples	473	181	73	219
Both Wanted Fewer Children Than They Had	49	7	14	28
Both Wanted Same Number That They Had	205	55	40	110
Both Wanted More Children Than They Had	219	119	19	81
B. COUPLES WITH THE HUSBAND WANTING ONE CHILD LESS THAN THE WIFE				
All Couples	171	58	46	67
Both Wanted Fewer Children Than They Had	3	1	2	—
Husband Wanted Fewer, Wife Same Number	42	3	17	22
Husband Wanted Same Number, Wife More	64	21	17	26
Both Wanted More Children Than They Had	62	33	10	19
C. COUPLES WITH THE HUSBAND WANTING ONE CHILD MORE THAN THE WIFE				
All Couples	141	73	18	50
Both Wanted Fewer Children Than They Had	9	—	4	5
Husband Wanted Same Number, Wife Wanted Fewer	26	7	8	11
Husband Wanted More, Wife Same Number	59	37	1	21
Both Wanted More Children Than They Had	47	29	5	13
D. COUPLES WITH THE HUSBAND WANTING AT LEAST TWO FEWER CHILDREN THAN THE WIFE				
All Couples	137	37	46	54
Both Wanted Fewer Children Than They Had	2	1	1	—
Husband Wanted Fewer, Wife Same Number	28	5	5	18
Husband Wanted Fewer, Wife More	30	4	9	17
Husband Wanted Same Number, Wife More	62	19	28	15
Both Wanted More Children Than They Had	15	8	3	4

Table 9. (Continued)

Number of Children Wanted in Relation to Actual Fertility	All Planned and Quasi-Planned Families	Number and Spacing Planned	Number Planned	Quasi-Planned
E. COUPLES WITH THE HUSBAND WANTING AT LEAST TWO MORE CHILDREN THAN THE WIFE				
All Couples	85	30	17	38
Both Wanted Fewer Children Than They Had	3	—	—	3
Husband Wanted Same Number, Wife Fewer	14	4	2	8
Husband Wanted More, Wife Fewer	25	10	4	11
Husband Wanted More, Wife Same Number	32	13	11	8
Both Wanted More Children Than They Had	11	3	—	8

(a) Couples with wife and husband giving identical reports on number of children wanted at marriage.

(b) Couples with wife and husband differing by only one child in their reported wishes.

(c) Couples with wife and husband differing by more than one child in their reported wishes.

Group (b) is obviously one in which no real compromise between the spouses regarding the size of the family is possible. Within this group, the actual number of children borne more frequently agrees with the number wanted by the spouse who had wanted the lower number of children than with the number wanted by the other spouse, regardless of which spouse wanted fewer children.

Among couples of group (c), however, where a real compromise in family size is possible, such a compromise is reached in about 25 per cent of the cases. In about 54 per cent of the cases the actual number of children is the same as or even lower than that desired by the spouse who wanted the lower number. In about 21 per cent of the cases the actual number is the same as or even higher than that desired by the spouse wanting the larger number. Among couples with husbands

wanting at least two *fewer* children than the wife, 45 per cent had the exact number of children reported as wanted by the husband at marriage and 20 per cent had the number wanted by the wife. Among couples with husbands wanting at least two *more* children than the wife, 16 per cent had the exact number wanted by the husband and 38 per cent had the number wanted by the wife. (*See* Table 9.)

Exactly as the low absolute number of real compromises was *relatively* high as compared with the number of couples who had the choice of such a compromise, it can also be explained why so few (20 per cent) of the total number of planned and quasi-planned families of the sample had the exact number of children that was wanted by both spouses. Of the total couples who by chance or by actual agreement wanted the same number of children, group (a), almost one half (43 per cent) had, in fact, as many children as both spouses had wanted at the time of their marriage; most of the others obviously had fewer children. This is particularly borne out by the "number-planned" and "quasi-planned" families. In the "completely-planned" families the actual average family size is so small that most couples had actually fewer children than either spouse wanted at the time of marriage.

In the other groups, (b) and (c), frequencies are too small to permit an analysis of the effect of the planning status on the type of agreement reached.

In view of the intricacies encountered in trying to recognize

Table 10. Average difference between family size and number of children wanted at marriage by husband, according to fertility-planning status.[1]

Fertility-Planning Status	Number of Children Wanted By Husband						
	0	1	2	3	4	5	6[a]
Number and Spacing Planned	+0.5	−0.3	−1.0	−1.6	−2.2	(−2.0)	(−2.0)
Number Planned	+1.9	+0.9	+0.2	−0.6	−1.3	(−2.0)	—
Quasi-Planned	+1.7	+0.3	−0.1	−1.1	−1.1	(−1.7)	(−2.0)
Excess Fertility	+2.2	+1.0	+0.9	+0.1	−0.6	(+1.8)	(+2.0)

[1] Including couples with number of children wanted by wife "unknown." Parentheses indicate that less than 10 cases are involved.
[a] Does not include those wanting more than 6.

the mode of reaching an agreement regarding family size on the basis of observed data on the number of children wanted and actual family size only, it seems necessary to emphasize that over half (53 per cent) of the planned and quasi-planned families (Table 8A) had as many children as at least one of the spouses desired at the time of marriage. Among families of "excess fertility," in contrast, somewhat fewer than half of the couples (46 per cent) had the number of children that at least one of the spouses wanted. This difference is not very striking, unless one considers that most of the couples of "excess fertility" had made at least some effort at family limitation since marriage. Furthermore, in families with "excess fertility," as well as among the planned and quasi-planned the difference between the average number of children wanted at marriage and the average family size is less than one child. Nevertheless, this difference is somewhat larger among the "excess fertility" couples than among the others. In general, the problem of ascertaining the circumstances under which the wish of the husband or that of the wife predominates, and the circumstances under which a compromise lying between opposing wishes is reached cannot be settled on the basis of the Indianapolis Study materials. It seems that the size of the difference between the wishes and perhaps also the direction of the difference have some effect on the agreement finally reached. But other factors are probably also of considerable importance. It should finally be remembered that only the actual family

Table 11. Average difference between family size and number of children wanted at marriage by wife, according to fertility-planning status.[1]

Planning Status	Number of Children Wanted By Wife						
	0	1	2	3	4	5	6[a]
Completely Planned	+0.5	0	−1.0	−1.5	−2.3	(−3.0)	(−5.0)
Number Planned	(+2.4)	(+1.7)	+0.1	−0.8	−1.5	(−2.0)	(−4.0)
Quasi-Planned	+1.6	+0.2	−0.2	−0.8	−1.5	(−1.0)	(−3.3)
Excess Fertility	+2.3	+0.6	+1.0	−0.1	−0.5	(+4.0)	(−2.2)

[1] Including couples with number of children wanted by husband "unknown". Parentheses indicate that less than 10 cases are involved.
[a] Does not include those wanting more than 6.

size and not the agreed desired family size could, here, be compared with the number of children desired at marriage.

Tables 10 and 11 give average differences between premarital wishes and actual accomplishments with respect to size of family. Fundamentally, the previously stated arguments against using the product-moment correlation coefficient as a measure of the relation of number of children wanted at marriage by the two spouses also apply to efforts at summarizing the relation of number of children wanted at marriage by either spouse to the total actual fertility of the couple. However, zero-order coefficients of correlation (r) between actual fertility (A) and number of children reported at marriage by the father (F) and mother (M) are shown below for all couples and for those in the number and spacing planned group. The multiple correlation coefficients $R_{A(FM)}$ are also shown.

Among all couples, regardless of fertility-planning status, the predictive value of the number of children wanted at the time of marriage by both the father and the mother is very low:

$$r_{AF} = .30,\ r_{AM} = .32 \text{ and } R_{A(FM)} = .38$$

It may be noted that the number of children wanted at marriage by the mother is slightly more correlated with actual family size than number of children wanted at marriage by the father, but the difference is small. Furthermore, it is seen that there is a certain advantage in using both the number of children wanted at marriage by the mother and the corresponding figure for the father in predicting fertility: the coefficient of total correlation being larger than either of the simple zero-order coefficients.

Among completely-planned families the results are very similar:

$$r_{AF} = .38,\ r_{AM} = .40 \text{ and } R_{A(FM)} = .45$$

All correlations are slightly stronger, but the predictive value is still low.

This should not be interpreted as a denial that the number of children wanted at marriage is a useful datum for population

forecasts. The correlation coefficients computed here show only how much the knowledge of the number of children wanted at the time of marriage by the spouses helps to improve an estimate of the final size of a family, as compared with taking the average size for the cohort as an estimate for each and every family. The low coefficients of correlation mean, therefore, only that if the average family size of a cohort is known, the knowledge of number of children wanted at marriage by the spouses does not add much useful information. But in the problem of forecasting, with which we are concerned here, this average family size is not known and must be forecast on the basis of the data on number of children wanted at marriage.

The problem with which the population forecaster would therefore really be confronted, is the following: Does the number of children wanted at marriage reflect the behavior which is in fashion at the time it is ascertained, i.e., does the number stated by brides and grooms at the time of a marriage reflect the "normal" fertility behavior at the time of this marriage, or do these figures presage the future behavior of the couple concerned?

The data of the Indianapolis Study provide no valid basis for final judgment on this question. They do show that there is a considerable correspondence between the number of children reported as wanted at the time of marriage, both by the husband and by the wife and the size of their completed family. At the same time these data show that much more information on the relationship between the number of children wanted at the time of marriage and actual family size is needed before some information on the former can be used efficiently for forecasting the latter.

Summary

In this paper an attempt is made to discuss some of the properties of data regarding number of children wanted at the time of marriage by wives and husbands. The strengths and weaknesses of concrete data from several specific studies are considered. A weakness of the data from the Indianapolis Study

is that they are *ex post facto.* The Indianapolis Study was restricted to couples married 12–15 years. Hence, to an indeterminant extent, the replies to the question regarding number of children wanted at marriage may be influenced by the number of children actually born. The correlation of fertility desires with fertility performance doubtless is unduly high because of the *ex post facto* nature of the data on fertility desires.

Despite the limitations, the Indianapolis Study data on fertility desires of the spouses (separately and jointly considered) in relation to fertility-planning status and actual fertility point up some interesting internal differences and relationships.

The data point up the popularity of the two-child family. Over half of the wives (54 per cent) and husbands (55 per cent) stated that at the time of marriage they had wanted two children. Among about one-third of the couples *both* wife and husband stated that they wanted two children.

With the increasing prevalence of family planning, size of family probably is coming more and more under control. At the same time probably few students expect the stated fertility desires at the time of marriage to remain unaltered and effective. It seems more likely that attitudes regarding family size may often undergo changes as a result of desires of the spouse, and changing economic and social factors, and experience with children themselves. On these things very little is known at present. From several recent, current and prospective studies we hope to learn more about the factors affecting fertility desires.

ANNOTATIONS

ECONOMIC NEEDS OF OLDER PEOPLE[1]

THIS book represents another valuable survey of current economic problems that was sponsored by the Twentieth Century Fund. The Study was set up like some of the previous ones organized by that foundation. The Fund commissioned John J. Corson and John W. McConnell, both well-qualified by training, experience, and interests for their work in this field, to carry out the research and to serve as authors of the report ECONOMIC NEEDS OF OLDER PEOPLE. It appointed an equally distinguished group, although somewhat more diverse with respect to interests and outlook, to serve as a Committee on Economic Needs of Older People.[2] The function of the Committee was to take the finished report of the research staff as a point of departure, to review the findings and set forth some recommendations for social policy. The report of the Committee appears as the last chapter of the book itself.

The book begins with some arresting figures regarding number and characteristics of the aged. During the past half-century (since 1900) the number of persons 65 and over in the United States has virtually quadrupled, whereas the total population has only doubled. In 1900 persons 65 years of age and over numbered about 3 million and formed 4.1 per cent of the total population. In 1950 they numbered 12.3 million and formed 8.1 per cent of the population.

As for economic need the authors report that over a third (36 per cent) of the people 65 and over have no income of their

[1] Corson, John J. and McConnell, John W.: ECONOMIC NEEDS OF OLDER PEOPLE. New York. Twentieth Century Fund, 1956, 533 pp. $4.50.

[2] This Committee consisted of Arthur H. Dean, Chairman; Harry J. Becker; James A. Brownlow; Eveline M. Burns; Joseph S. Davis; and M. Albert Linton.

own at all; some 38 per cent have an annual income of under $1,000; 11 per cent have a yearly income of $1,000–1,999 and 15 per cent have $2,000 and over.

As for source of income, about one-third of the persons 65 and over were receiving social security benefits or benefits from related public and private retirement programs; 30 per cent were at work or were wives of wage earners; 20 per cent were receiving public assistance; 12 per cent were receiving income from savings, investments, insurance, veterans' benefits, and help from relatives; and 5 per cent were in public or private homes, hospitals, and other institutions.

The authors point out that conventional figures regarding unemployment by age tend to understate the amount of unemployment among the aged. The reason is that non-working people 65 years of age and over are generally regarded as not belonging to the labor force at all.

In an effort to get at the causes of retirement among retired people 65 years old and over, the authors found that over half (56 per cent) retired because the employer's policy on age compelled them to do so; 26 per cent retired voluntarily because of poor health or accident; 9 per cent retired "to have more time to themselves"; 5 per cent retired for miscellaneous reasons including illness of spouse, moving to another locality, etc.; and 4 per cent retired because their jobs were discontinued.

In addition to description of the aged persons themselves and their economic needs, the book provides summary histories of the origin, development, and provisions of the federal old-age assistance and social insurance programs since 1935; discussion and appraisal of various private insurance programs; and a "look to the future."

The policy-recommendations of the Committee is an interesting document in that despite the apparently somewhat diverse differences in economic ideology represented in the Committee membership and despite the failure to get unanimous agreement on all points, there was agreement regarding the increasing seriousness of economic problems of the aged and regarding the need for wider coverage of social security benefits. There was also agreement, at least in principle, that responsibility for meeting the economic needs of the aged should

be shared by three groups: the individuals themselves, the employers and unions, and the government. The book in a sense reflects the history of social legislation in general. The battle is only half won when the facts and figures are collected and presented. There must also be the revisions, compromises, and further revisions that are demanded by conflicts and differences in interests and outlook.

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